

**Notes on the Tropical American Species of Tipulidae (Diptera).
VI. The Tribe Limoniini, Genus *Limonia*: Subgenera *Limonia*,
Neolimnobia, *Discobola* and *Rhipidia*.**

By Charles P. Alexander, University of Massachusetts,
Department of Entomology, Amherst, Massachusetts.

(With 42 figures)

In the present and succeeding part under this title I am considering the great genus *Limonia* Meigen, largest and most widely distributed of all genera in the Tipulidae. Both the genus *Tipula* Linnaeus (Part X of these Notes) and the present genus total in excess of 1500 described species and are among the largest genera in the entire order. It is certain that a number of further species remain to be discovered and it is questionable as to which of these two groups will eventually prove to be the richest in number of species. It is my opinion that this will prove to be *Limonia*, chiefly because of an almost unparalleled diversity in body structure and also because of its virtually cosmopolitan distribution. Species of *Limonia* occur on all the continents and major islands, excepting only those under arctic and antarctic conditions, and further are found on very many of the remote oceanic islands, to where it seems evident they have been dispersed by the agencies of wind and water. *Tipula*, on the other hand, is lacking in New Zealand and in Australia, with the exception of the extreme north. Further, it is quite lacking on all remote Pacific islands.

At this time I am considering briefly the genus *Limonia* as a whole and am treating approximately one-half of the included subgenera and species, the remainder to be discussed in Part VII. The subgenera considered at this time are as follows:

Tribe Limoniini	Subgenera
Genus <i>Limonia</i> Meigen	<i>Limonia</i> Meigen
	<i>Neolimnobia</i> Alexander
	<i>Discobola</i> Osten Sacken
	<i>Rhipidia</i> Meigen

A general consideration of the genus *Limonia*

Frontal prolongation of head very variously formed in the different subgenera, in the more typical groups shorter than the remainder of head and without a nasus. Mouthparts primitively with 4-segmented maxillary palpi, these becoming reduced both in size and number of segments, the minimum a single segment; in *Geranomyia* and some *Zelandoglochina* the rostrum greatly

elongated, in cases fully as long as remainder of body, comprised of the greatly lengthened labial palpi and the median hypopharynx. Antennae 14-segmented though sometimes appearing to possess 15 segments due to the elongation and slight constriction at near midlength of the terminal segment; antennae usually short, very rarely lengthened, in such cases extending approximately to the base of the abdomen, the condition being restricted to the male sex. Flagellar segments usually simple, oval, narrowed at the incisures and frequently with gradual or abrupt apical pedicels to give the organ a beadlike appearance; flagellar verticils present, sometimes very long. In *Rhipidia*, discussed in detail later in this report, and in some species of *Zelandoglochina* (Notes, VII) the flagellar segments are variously branched, sometimes strikingly so, to present a pectinate to flabellate appearance. Head with the anterior vertex sometimes broad, more commonly narrowed by the approximation of the eyes, in cases the head narrowly to more broadly holoptic, the condition more accentuated in the male sex. Very commonly the anterior vertex in the male is narrower than the diameter of the scape of the antenna.

Cervical region and pronotum usually large and well-developed, reaching its maximum in species such as *longicollis* (Macquart), by some considered to represent a valid subgenus (*Telecephala* Pierre). Mesonotum commonly gibbous, in cases projecting slightly cephalad over the pronotum; in some species of *Rhipidia* in the local fauna (*conica* group) with the praescutum produced dorsad and slightly cephalad into a prominent cone or spine. Tuberculate pits lacking. Pseudosutural foveae lacking or much reduced in size. Thorax commonly glabrous or with reduced vestiture; pteropleurite with or without setae. Halteres varying from short and stout to excessively long and slender. Legs usually long to very long; no tibial spurs; claws almost always toothed, in the most accentuated cases with three or four strong teeth, the outermost largest; arolium much reduced.

Wing venation unusually uniform throughout the entire genus (Fig. 1). Vein Sc of various lengths, the character of importance in defining the various subgenera; in some, including *Limonia*, *Libnotes*, *Metalimnobia* and others, Sc is long, extending far beyond the level of the origin of Rs; in others, including *Dicranomyia*, *Neolimnobia*, *Peripheroptera*, many *Geranomyia*, and others, the vein is short, Sc₁ ending nearly opposite the

radial fields is found in the Limoniini, and likewise in the subfamilies Tipulinae and Cylindrotominae, and in the Old World tribe Lechriini. Briefly described and as interpreted by me, vein Sc at its fork sends Sc_1 into costa, Sc_2 into vein R_1 with which it fuses for a distance to produce the element Sc_2-R_1 , Sc_2 finally breaking free to the costal border as a vein that is termed "the free tip of Sc_2 ", the so-called "costal crossvein" of Brunetti. A somewhat complicated arrangement of the veins in the vicinity of the stigma results that is perhaps best explained by the series of diagrams provided herewith (Figs. 2-9, inclusive, with their explanations). These are adapted from comparable figures prepared by me in the treatment of the Tipuloidea in C. H. Curran's, "The families and genera of North American Diptera, 1939:38-39".

Radial sector invariably 2-branched, the marginal veins being R_3 and R_{4-5} . In rare cases, reaching its maximum in the subgenus *Gressittomyia* Alexander, veins R_{4-5} and M_{1-2} are fused, obliterating the $r-m$ crossvein. Cell M_1 always lacking so a maximum of three branches of M reach the margin, these being M_{1-2} , M_3 and M_4 ; in the subgenus *Alexandriaria* Garrett (extra-limital), only two branches of M persist, these being M_{1-2} and M_4 , both sections of vein M_3 , as well as the m crossvein being entirely atrophied. Cell *1st* M_2 is commonly present, sometimes open by the atrophy of m , in other cases open by the atrophy of the basal section of vein M_3 . Crossvein $m-cu$ commonly at or close to the fork of M in many subgenera, including *Limonia*, *Dicranomyia* and others, more rarely lying far distad, as in *Libnotes* and others. Only rarely does the crossvein lie some distance before the fork in the Neotropical species. The weak vein Cu_2 is commonly long and well preserved, in some Australasian groups partially to entirely atrophied. Two Anal veins commonly present, reduced to a single vein in the subgenus *Doaneomyia* Alexander. Anterior arculus present; prearcular field generally short and much restricted, long and reaching its maximum size within the family in the subgenus *Peripheroptera* (Notes, VII). In certain other species and subgenera the base of the wing is unusually slender and long-petiolate, the prearcular field thus being lengthened but very narrow.

Male hypopygium while showing a remarkably uniform basic plan or structure provides unusually strong characters for the separation of species and definition of subgenera. Tergite and sternite completely separated by membrane, the sternite being

reduced in size or, in some groups, entirely lacking. Ninth tergite a large, generally transverse plate, that is, broader than long, the posterior margin usually notched or emarginate to form two lobes of various shapes and outlines in different species; vestiture of tergite commonly with the setae concentrated on the lobes or along the margins. Proctiger usually pale and membranous, large but inconspicuous, but in some forms, especially in the subgenera *Dicranomyia* and *Rhipidia*, enlarged and highly complex in structure, heavily sclerotized or blackened, in such cases becoming the single most conspicuous element of the hypopygium (compare *Rhipidia* spp., Figs. 31, 35A). This striking development of the proctiger in *Rhipidia* suggests the somewhat comparable condition found in the subgenus *Microtipula* of the genus *Tipula* (compare, Notes on the Tropical American species of *Tipula*, Parts I, II; Revista, 1945). Basistyle almost invariably with a lobe on the ventral or mesal face, termed the *ventromesal lobe*, variously formed and modified and providing strong specific characters. Dististyles terminal in position. In the most primitive condition, as shown by the typical subgenus, there is a single dististyle which is but slightly modified from the generalized cylindrical type of the lower Nematocera; in other species and groups, as in the so-called *apicata* group in the local fauna, the style is still simple but is variously modified in form. In very many species, distributed in virtually all of the known subgenera and including all of the species figured in the present report, there is a strong dorsal arm or separate style formed, termed the *dorsal dististyle*, this usually appearing as a long slender rod, either straight or slightly curved, usually narrowed to an acute terminal spine. The larger fleshy style, termed the *ventral dististyle*, is almost invariably produced or extended on its mesal face into a beaklike blade that is called the *rostral prolongation*. This is of various shapes and commonly bears two spines, usually placed at or beyond midlength of the prolongation but, in cases, more basal or even placed on the main body of the style itself (as in *Limonix*, *Discobola*, and others). In the most accentuated cases, the spines are found on the summit of the style or even near the base of the outer face, a condition described in detail in another paper (Alexander, Philippine Journ. Sci., 55:38-39; 1934). In some species or groups, as in *Geranomyia*, the spines may arise from the summits of long basal tubercles. The rostral spines, while commonly two in number may be more numerous, in the extreme cases up to 10 or 12 (as in

some *Rhipidia* and *Dicranomyia*). In some species in the local fauna (as in Fig. 15) the rostral spines are lacking or exceedingly reduced. Aedeagus very conspicuous, appearing as a simple sclerotized rod or tube, arising from the ventral floor of the genital chamber, extending caudad and slightly ventrad as a variously formed organ; genital openings paired, in cases with the apex of the aedeagus bilobed to accomodate the two apertures, in other cases the openings merely flush with the surface. Gonapophyses paired, subtending the base of the aedeagus, appearing as flattened blades or plates, the inner apical angle being variously produced into a lobe or spine, termed the *mesal-apical lobe*. The ovipositor of the female has the valves (cerci and hypovalvae) elongate and sclerotized, as common in the family, in cases with the apex of the cercus bidentate.

Habitats of the Immature Stages

As might be expected in a group so vast and diversified as is the present one, the immature stages ou the various species of *Limonia*, as known, frequent a wide range of ecological habitats, including virtually all those to be found in the entire family Tipulidae. At this time I am providing a broad distribution of such habitats, arranged from the aquatic to the terrestrial types. More specific details will be given under the discussions of the individual local subgenera.

1. Marine species. Living in the intertidal zone among growths or deposits of algae on the earth or rocks. Included subgenera: *Limonia*, *Dicranomyia*, *Geranomyia*, *Idioglochina*. The last-named group, very characteristic of the Pacific islands, will probably be found to be restricted to this type of habitat. A small number of species of *Dicranomyia* live in comparable situations inland where the saline content of the water is even higher, as the Great Salt Lake, Utah, U.S.A.

2. Fresh-water species. Living in water but coming to the surface for oxygen and moving to dryer areas for the purpose of pupation. Other species live in or beneath a layer or film of algal growth, with the water percolating through or flowing over them (hygropetric); still other species inhabit algal or mossy growths in streams. Included subgenera: *Limonia*, *Dicranomyia*, *Geranomyia*, *Alexandriaria*. No species of *Limonia* is yet known that is as strictly aquatic as is *Antocha* (Notes, VIII) or *Aphrophila* (Notes, II).

3. Bryophilous species. Living in or beneath moist to

saturated mats or cushions of mosses or liverworts growing on earth or rocks. Included subgenera: *Libnotes*, *Dicranomyia*, *Geranomyia*.

4. Living in rich organic earth or mud, as at the margins of rills, streams, lakes or other water bodies, or in the comparable organic soil of swamps and marshes; in leaf drift gathered at stream margins or in wet pockets in woods. Included subgenera: *Limonia*, *Dicranomyia*.

5. In sandy, gravelly or loamy soil, with but slight humus, at margins of streams or ponds. Included subgenus: *Rhipidia*.

6. Beneath leaf mold in rich moist to saturated humus soil in woods. Included subgenera: *Limonia*, *Rhipidia*, *Dicranomyia*.

7. Living in wet or saturated decaying wood that is permeated with fungous mycelia; in fermenting sap beneath bark of trees. Included subgenera: *Limonia*, *Metalimnobia*, *Discobola*, *Rhipidia*.

8. In fungi, either woody or fleshy, sometimes in advanced stages of decay; in the mycelia of such fungi penetrating decaying wood. Included subgenus: *Limonia*, *Metalimnobia*.

9. In decaying animal or plant materials, as in piles of rotting stems, fruits or inflorescence, in various stages of putrefaction, including banana, taro and other plant species. Included subgenera: *Limonia*, *Libnotes*, *Rhipidia*.

10. Living in small gelatinous globules attached to the tips of leaves of tropical plants, as palms. Included subgenus: *Geranomyia*.

11. Mining leaves. Included subgenus: *Dicranomyia*. To date only two leaf-mining crane-flies have been recorded, one in the Hawaiian Islands, the other in Samoa.

The biology of the Tipulidae has been summarized in two papers by the writer:

- Alexander, C. P., 1920. The crane-flies of New York. Part II. Biology and Phylogeny. Cornell Univ., Agr. Expt. Sta., Mem. 38: 691-1133, pls. 11-97 (Bibliography of immature stages to 1920).
— 1931. The crane-flies (Tipulidae, Diptera). Deutsche Limnologische Sunda-Expedition. Archiv für Hydrobiol., Suppl. Bd. 9, Tropische Binnengewässer, Bd. 2, pt. 36: 135-191, 2 pls. (Bibliography of immature stages 1920-1930. Summary of larval habitats of Tipulidae).

General Distribution

A list of the apparently valid subgenera is given, indicating the date of proposal and the biotic regions where found.

Subgenus	Subgenotype	Range
<i>Limonia</i> Meigen, 1803	<i>tripunctata</i> Fabr.	Hol, Eth, Or, Aust,
<i>Rhipidia</i> Meigen, 1818	<i>maculata</i> Meigen *	Cosmopolitan
<i>Dicranomyia</i> Stephens, 1829	<i>modesta</i> Melgen	Cosmopolitan
<i>Geranomyia</i> Haliday, 1833	<i>unicolor</i> Hal.	Cosmopolitan, excepting N. Z.
<i>Discobola</i> Osten Sacken, 1865	<i>annulata</i> Linn.	Hol, Aust, Or. Neo.
<i>Peripheroptera</i> Schiner, 1866	<i>nitens</i> Schiner	Neo.
<i>Libnotes</i> Westwood, 1876	<i>thwaitestana</i> Westw.	Or, Aust, E. Pal.
<i>Dapanoptera</i> O. S., 1881	<i>perdecora</i> Walker	Aust, chiefly Papuan
<i>Thrypticomyia</i> Skuse, 1890	<i>aurelpennis</i> Skuse	Aust, Or, E. Pal, Eth.
<i>Zalusa</i> Enderlein, 1906	<i>falklandica</i> End.	Neo (Antarctic)
<i>Metalimnobia</i> Mats., 1911	<i>vittata</i> Matsumura	Hol, Or, Eth, Neo.
<i>Doaneomyia</i> Alex., 1921	<i>tahitiensis</i> Alex.	Aust, Or.
<i>Euglochina</i> Alex., 1921	<i>cunetiformis</i> de Meij.	Aust, Or, Eth.
<i>Idioglochina</i> Alex., 1921	<i>tusitata</i> Alex.	E. Pal, Or, Aust.
<i>Pseudoglochina</i> Alex., 1921	<i>pulchripes</i> Alex.	E. Pal, Or, Aust.
<i>Alexandriaria</i> Garr. 1922	<i>suffusca</i> Garrett	Hol, Or, Aust.
<i>Zelandoglochina</i> Alex., 1924	<i>huttoni</i> Edwards	Neo (Chile); Aust. (NZ).
<i>Laosa</i> Edwards, 1926	<i>gloriosa</i> Edwards *	E. Pal, Or, Aust.
<i>Neolimnobia</i> Alex., 1927	<i>diva</i> Schiner	Neo.
<i>Gressittomyia</i> Alex., 1936	<i>xenoptera</i> Alex.	Or.

Biotic abbreviations: Aust-Australasian; Eth-Ethiopian; Hol-Holarctic; Neo-Neotropical; N. Z.-New Zealand; Or-Oriental; Pal-Palaeartic.

Affinities of the genus *Limonia*

A number of other subtribes are placed in the tribe Limoniini and the regional ones will be treated in Part VIII of these Notes. These include the Photoheliaria, Heliaria, Antocharia, Tonnoiro-myaria, Orimargaria and Dicranoptycharia. The present subtribe, the Limoniaria, includes only the genus *Limonia* as herewith discussed. From the viewpoint of phylogeny, there can be no reasonable doubt but that the closest relatives of the present tribe include the subfamilies Tipulinae and Cylindrotominae, and the tribe Lechriini. The venation of the radial field of the wing is very similar in all of these groups and provides strong evidence of their relationship. Moreover, the basic plan of structure of the male hypopygium in some of the more primitive Tipulinae (Notes, IX) is virtually identical with the generalized condition

*) The name *maculata* is preoccupied and the later designation of one of the geographical races will have to be adopted as the name for the species.

The name *gloriosa* is preoccupied and I am re-naming this species *Limonia (Laosa) iris* nom. n., for Miss Iris Edwards, youngest daughter of the late Fred Edwards and Mrs. Edwards. (*Turcomyia gloriosa* Alexander, Can. Ent., 44: 337-338; 1912. *Laosa gloriosa* Edwards, Encycl. Entomol., Diptera, 3: 49; 1926).

Goniodineura van der Wulp, 1895; type *nigriceps* vdW; now placed in the synonymy of *Libnotes*.

found in the present genus. The similarity of the wing venation in various species of *Limonia* and some of the primitive Tipulinae is most striking (compare the genus *Tanypremna* Osten Sacken, subgenus *Limoniodes*, as discussed by the present writer, Ann. Mag. Nat. Hist., (11) 1: 337-339; 1938).

Generic position of species erroneously placed in *Limonia*

Koloman Kertész, in the Tipulidae of his great catalogue of the Diptera (Catalogus Dipterozum, 2: 155-359; 1902) included a considerable number of Tropical American Tipulidae described by various early authors in the comprehensive genus *Limnobia* (now *Limonia*) and not correctly placed by subsequent students of the family. Most of the species have now been recognized and re-assigned to what appears to be their proper systematic position. These species are listed throughout this series of NOTES in their proper places but it is believed that a summary of the species, their accepted position and the part of these Notes where they are further discussed, may be found useful.

Species	Accepted generic position	Notes	Part
<i>adpersa</i> Wiedemann	<i>Epiphragma</i>		IV
<i>antarctica</i> Walker	<i>Shannonomyia</i>		V
<i>bifasciata</i> Fabricius	<i>Teucholabis (Teucholabis)</i>		I
<i>bituberculata</i> Macquart	<i>Hexatoma (Eriocera)</i>		V
<i>calopus</i> Walker	<i>Lecteria (Lecteria)</i>		IV
<i>chlorotica</i> Philippi	<i>Limonia (Dicranomyia)</i>		VII
<i>chrysoptera</i> Walker	<i>Hexatoma (Eriocera)</i>		V
<i>decasbilla</i> Wiedemann	<i>Limnophila</i>		V
<i>diva</i> Schiner	<i>Limonia (Neolimnobia)</i>		VI
<i>elqutensis</i> Blanchard	<i>Limonia ?</i>		VI
<i>flaviceps</i> Wiedemann	<i>Hexatoma (Eriocera)</i>		V
<i>flavida</i> Philippi	<i>Limonia (Dicranomyia)</i>		VII
<i>guttata</i> Philippi	<i>Limonia (Limonia)</i>		VI
<i>infumata</i> Philippi	<i>Limonia (Dicranomyia)</i>		VII
<i>insularis</i> Williston	<i>Limonia (Limonia)</i>		VI
<i>litaeicollis</i> Blanchard	<i>Limonia sens. lat.</i>		VI
<i>livida</i> Say	<i>Limonia (? Dicranomyia)</i>		VII
<i>longicollis</i> Bigot	<i>Limonia (Zelandoglochina)</i>		VII
<i>longimana</i> Fabricius	<i>Ozodlcera (Ozodlcera)</i>		IX
<i>maculata</i> Fabricius	<i>Epiphragma</i>		IV
<i>melanocephala</i> Fabricius	<i>Teucholabis (Teucholabis)</i>		I
<i>multipunctata</i> Fabricius	<i>Limonia (? Rhpldia)</i>		VI
<i>obscura</i> Fabricius	<i>Lecteria (Psaronius)</i>		IV
<i>obscurata</i> Blanchard	<i>Erioptera (Trimicra)</i>		III
<i>ocellata</i> Röder	<i>Limonia (Limonia)</i>		VI
<i>ornatipennis</i> Blanchard	<i>Limonia, sens. lat.</i>		VI
<i>pallida</i> Macquart	<i>Limonia, sens. lat.</i>		VI
<i>phatta</i> Philippi	<i>Limonia (Limonia)</i>		VI
<i>polysticta</i> Philippi	<i>Limonia (Limonia)</i>		VI
<i>punctatissima</i> Wiedemann	<i>Epiphragma</i>		IV
<i>reciproca</i> Walker	<i>Erioptera (Trimicra)</i>		III
<i>simplex</i> Wiedemann	<i>Teucholabis (Teucholabis)</i>		I
<i>stictica</i> Blanchard	<i>Limonia (Limonia)</i>		VI

<i>stigmatica</i> Blanchard	<i>Limonia</i> , sens. lat.	VI
<i>varia</i> Wiedemann	<i>Epiphragma</i>	IV
<i>venezuelensis</i> Macquart	<i>Teucholabis</i> (<i>Teucholabis</i>)	I
<i>vernalis</i> Philippi	<i>Limonia</i> (<i>Dicranomyia</i>)	VII

I am greatly indebted to Dr. S. L. Puxen, custodian of the Fabrician types in the Natural History Museum in Copenhagen, and to my long-time friend and co-worker on the Tipulidae, Mr. Peder Nielsen, of Silkeborg, for helping to settle the identity of *longimana* Fabricius, whose strict systematic position has remained in doubt.

Limonia Meigen

Amphinome Meigen; Nouv. Class. Mouches, p. 15; 1800; preocc. by *Amphinome* Bruguiere, 1792; (nom. nud., no type).
Limonia Meigen; Illiger's Mag. für Insektenk., 2: 262; 1803; (type *tripunctata* Fabricius).
Limnobia Meigen; Syst. Besch., 1: 116; 1818; (type *tripunctata* Fabricius).
Unomyia Meigen; Syst. Besch., 1: 135; 1818; (type *tripunctata* Fabricius).
Ataracta Loew; Bernstein und Bernsteinauna, p. 38; 1850; (nom. nud., no type).
Numantia Bigot; Ann. Soc. Ent. France (3) 2: 470; 1854; (type *jusca* Meigen).
Limnomyza Rondani; Prodromus Dipterologiae Italicae, 1: 185; 1856; (type *tripunctata* Fabricius).
Atypophthalmus Brunetti; Rec. Indian Mus., 6: 273; 1911; (type *umbrata* de Meijere, as *holopticus* Brunetti).

When limited to those species that are strictly consubgeneric with *tripunctata*, the subgenus *Limonia* includes about 50 species that are chiefly Holarctic, Oriental and Australasian in distribution. There are very numerous species in most faunal areas that deviate in various manners from the strict characters of the group and are still referred to the typical subgenus on the basis of venation. The two subgenera that will be found to absorb most of these miscellaneous forms are *Limonia* and *Metalimnobia* but in each case there will have to be a re-definition of characters that will broaden the subgeneric limits. The alternative seems to be the creation of still further and obviously very weak subgenera that will have to be defined on slight characters of venation, trichiation of the wing veins, and the details of structure of the male hypopygium. In the light of experience, the latter procedure seems very unsatisfactory to me and it is preferred to retain the broader concepts despite the fact that these are based on highly artificial characters.

Edwards (1938) in separating *Metalimnobia* from *Limonia*, s. s., made use of the distribution of the trichia of the wing veins. In *Limonia*, *Sc* is glabrous, *R* with trichia with the exception of a portion of the vein immediately beyond the arculus which is glabrous. *Metalimnobia* has much more abundant trichia, including complete series on both *Sc* and *R* beyond the arculus, with a less constant distribution of trichia on these veins in the prearcular field. In the Neotropical fauna, as listed below, the majority of the species conform more closely to *Metalimnobia*

in having rather abundant trichia on both *Sc* and *R*, and also in the abbreviated section of vein *R+Sc*, distad of the level of vein *R*₂ but from the structure of the male hypopygium scarcely seem to belong here. For the present I am retaining such species in the typical subgenus. It may be noted that while the majority of the species in *Limonia*, s. s., have the venation of the outer radial field as in Fig. 9, whereas *Metalimnobia* has it more as in Fig. 6, a Nearctic species, *sociabilis* (Osten Sacken) has the outer vein much shorter than in the other species of the restricted subgenus, being scarcely longer than *R*₂, and thus agreeing closely with the condition found in *Metalimnobia* and others.

The immature stages of a number of species in the typical subgenus are now known. Many of these are found in decaying wood that is permeated with fungous mycelia. The Nearctic *subapicata* Alexander, a member of the extensive Neotropical *apicata* group, was found in Florida by Professor J. Speed Rogers. The larvae live in the damp wood powder in the region of the cambium in conifers of the genus *Pinus*. Many other species of *Limonia*, s. s., are found in humous earth and beneath decaying leaves in woods. The majority of the species of *Metalimnobia*, where the immature stages are known, are fungicolous, but others live in decaying wood and in organic earth. Attention is called to *Limonia rara* (Osten Sacken), a Nearctic species that belongs to an extensive group of Neotropical members of the genus that may well be found to have a comparable larval habitat; here the immature stages occur in decaying wood. The rather abundant members of the group in its less restricted sense that have a more aquatic habitat should be noted. Such flies include types that dwell in moss or algae growing on wood or stones saturated with water, the larvae living in delicate silken tubes from which they feed and which they may leave for short periods of time. The widespread *umbrata* de Meijere, listed below, has this habitat (J. C. H. de Meijere, Zool. Jahrb., Syst., 40: 197-198; 1916).

The species listed below fall in what appear to represent natural groups, of which the *eiseni* and *insularis* groups are very characteristic of the Neotropical fauna.

1. The *eiseni* group. Male hypopygium with the dorsal dististyle glabrous and without roughened points. Basistyle with the ventromesal lobe low to very low. Spines of the rostral prolongation placed on the disk or near the base, surrounded by an area of silken hairs. Venation showing no reduction in the

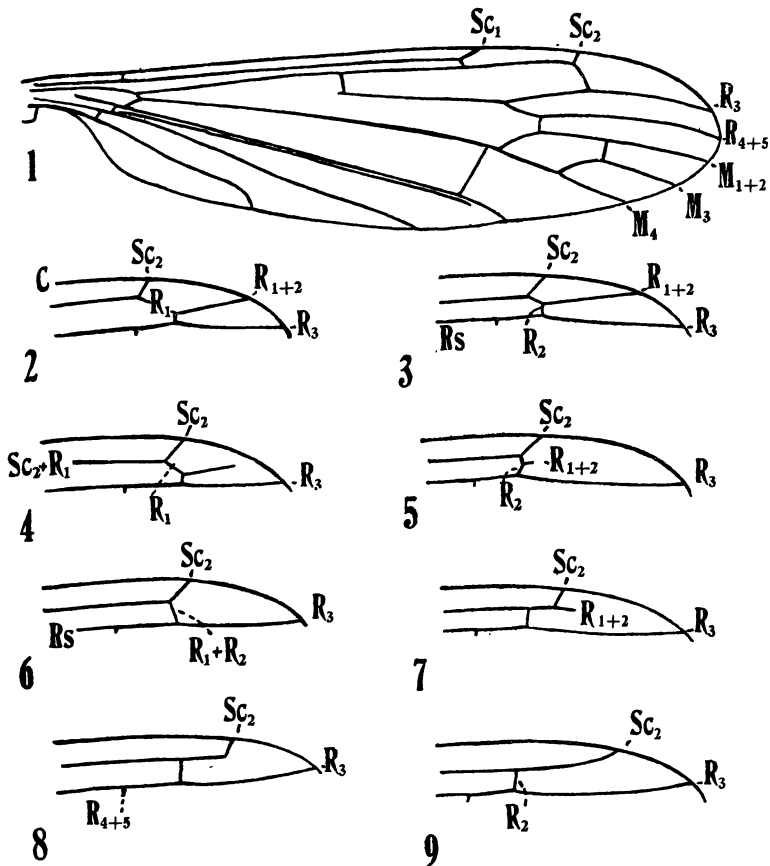


Fig. 1. *Limonia (Limonia) dicax* Alexander; venation. — Figs. 2-9. Diagrammatic series to illustrate the method of modification of the outer subcostal and radial fields of the wing (as found in the Tipulinae, Cyliindrotominae, Lechriini and Limoniini). — Fig. 2. The type found in the subtribe Orimargaria (Notes, VIII); Sc₂ preserved, R₁-2 complete, attaining the wing-margin. — Fig. 3. A further development of the last—Sc₂ has moved distad, shortening R₁; R₁-2 still entire. — Fig. 4. Condition as in the last but with the tip of vein R₁-2 atrophied (found in several Orimargaria and Limoniaria). — Fig. 5. An accentuation of the last; the atrophy of R₁-2 is so great that a mere spur results, R₁ is still more shortened and in more or less transverse alignment with R₂ and the free tip of Sc₂. — Fig. 6. A still further modification of last. The atrophy of the vein R₁-2 is now complete and veins R₁ and R₂ are united into a single transverse vein, in virtual alignment with the free tip of Sc₂. This is the commonest type in the Limoniaria, being found in most of the following subgenera of *Limonia*, — *Dicranomyia*, *Geranomomyia*, *Rhplidia*, and others. — Fig. 7. A type that reverts back to the condition shown in Fig. 4, with a long spur of R₁-2 persisting and with the free tip of Sc₂ migrated distad along this spur to lie beyond the transverse level of R₂. A condition found in several subgenera of *Limonia*, — *Peripheroptera*, *Limonia*, *Libnotes*, etc. — Fig. 8. A further modification of last, where the free tip of Sc₂ has migrated to the extreme end of the spur of R₁-2 but still forms a rectangular bend. Example, *Limonia*, subgenus *Libnotes*. — Fig. 9. The culmination of the series, where the free tip of Sc₂ has migrated to the extreme tip of R₁-2 and then bands into the costal margin at a gently oblique angle. The common condition in many *Limonia*, as the subgenera *Limonia* and *Discobola*.

length of vein R_2 . The Nearctic *argenteiceps* (Alexander) and *rara* (Osten Sacken) likewise belong here.

amazonica
arrogantia
austera
binucronata
borinquensis
caribaea
cordillerensis
deceptrix
dicax
eiseni
euryleon
horrenda
hesione
huacapistanae
hyperphallus
immodica
indomita
jamaicensis
lachesis
lawlori
ludibunda
lustralis
macintyreii
optabilis
pastazicola
porrecta
roraimicola
sanctae-martae
subdomita
velasteguii

2. The *insularis* group. Male hypopygium with the dorsal dististyle large, scabrous. Rostral prolongation of the ventral dististyle cleaver-shaped, with the reduced sensory area lying far distad. Wings with vein R_2 shortened or eliminated by the approximation of adjoining veins. Some of the species with white bands on the legs.

aurigena
capnora
curraniana
esau (wings with macrotrichia)
felix
fumosa
grossa
infucata
ingens
insularis
leucoscelis
limbinervis
lutzi
mesotricha (wings with macrotrichia)

multisignata
pernobilis
praeclara
sciasma
trialbocincta

3. The *repanda* group. Wings with vein Sc very short, almost as in *Dicranomyia*.

amaryllis
brachycantha
contradistincta
melaxantha
meridensis
repanda

4. The *apicata* group. Male hypopygium with no dorsal dististyle, much as in typical *Limonia*.

acuminata
apicata
basistylata
egae
hoffmani
napoensis
paucilobata
rapax
sica
vorax

The remaining species in the fauna are more isolated and do not fall in any of the major groups listed.

List of Species

- acuminata* (Alexander). — Amazonian Peru.
alfaroi (Alexander). — Mexico, Costa Rica.
amaryllis Alexander. — Venezuela.
amazonica (Alexander). — Amazonian Brazil.
apicata apicata (Alexander). — Mexico, Panama, Venezuela, British Guiana.
apicata dominicensis Alexander. — Lesser Antilles: Dominica.
arrogantia Alexander. — Peru.
atritarsis Alexander. — Southeastern Brazil.
aurigena Alexander. — Ecuador.
austera, sp. n. — Peru.
basistylata (Alexander). — Jamaica.
bimucronata Alexander. — Ecuador.
(blanchardi Alexander, see *phatta*).
borinquensis, sp. n. — Puerto Rico.
brachycantha Alexander. — Peru.
capitonius Alexander. — Southeastern Brazil.
capnora (Alexander). — Amazonian Peru.
capnora metae Alexander. — Colombia.
caribaea Alexander. — Cuba.
catamarcana Alexander. — Northern Argentina.
cerbereana Alexander. — Patagonia.
chilensis (Alexander). — South Chile, Patagonia.

- (concinna, see simulans concinna).*
contradistincta (Alexander). — Southeastern Brazil.
cordillerensis (Alexander). — Colombia.
currani Alexander. — Panama.
deceptrix Alexander. — Southeastern Brazil.
dicax Alexander. — Peru.
domballah Alexander. — Hispaniola: Dominican Republic.
egae (Alexander). — Amazonian Brazil.
eiseni (Alexander). — Guatemala, Panama, British Guiana.
elegantula (Alexander). — Colombia.
elquiensis (Blanchard). — Chile (subgenus incertum).
esau Alexander. — Venezuela.
euryleon, sp. n. — Southeastern Brazil.
exercita Alexander. — Patagonia.
felix, sp. n. — Peru.
(fissilis Alexander, see umbrata).
fumosa (Alexander). — Panama, Venezuela, British Guiana.
gloriosa (Alexander). — Guatemala.
grossa Alexander. — Ecuador.
(guttata Philippi, see chilensis).
halophila Alexander. — South Chile.
hesione, sp. n. — Peru.
hoffmani Alexander. — Cuba, Puerto Rico.
horrenda Alexander. — Peru.
hostica Alexander. — Southeastern Brazil.
huacapistanae Alexander. — Peru.
hyperphallus Alexander. — Ecuador.
immodica Alexander. — Southeastern Brazil.
indomita Alexander. — Southeastern Brazil.
infucata Alexander. — Mexico.
ingens Alexander. — Southeastern Brazil.
insularis (Williston). — Lesser Antilles: St. Vincent.
jamaicensis Alexander. — Jamaica.
jujuyensis Alexander. — Northern Argentina.
lachesis Alexander. — Ecuador, Peru.
lawlori Alexander. — Panama, Ecuador.
leucoscelis, sp. n. — Peru.
limbinervis Alexander. — Peru.
lineicollis Blanchard. — Chile (subgenus incertum).
ludibunda Alexander. — Mexico, Panama.
lustralis Alexander. — Ecuador.
lutzi (Alexander). — British Guiana.
lydia, sp. n. — Southeastern Brazil.
macintyreii Alexander. — Ecuador, Peru.
melaxantha Alexander. — Panama.
meridensis Alexander. — Venezuela.
mesotricha Alexander. — Panama.
multisignata Alexander. — Southeastern Brazil.
napoensis (Alexander). — Amazonian Peru.
nothofagi Alexander. — South Chile, Patagonia.
obtusistyla Alexander. — Mexico.
ocellata (Röder). — Colombia.
omissivena (Alexander). — Northern Argentina.
optabilis Alexander. — Ecuador, Peru.
ornatipennis Blanchard. — Chile (subgenus incertum).

- pampoecila* (Alexander). — Costa Rica, Venezuela, southeastern Brazil.
- pastazicola* Alexander. — Ecuador.
- paucilobata* Alexander. — Panama.
- perflaveola* Alexander. — Mexico, Panama.
- pernobilis* Alexander. — Peru.
- perpuncticosta*, sp. n. — Peru.
- phatta* (Philippi). — Chile, Patagonia.
- pluvialis* Alexander. — South Chile, Patagonia.
- pluvialis correntosana* Alexander. — Patagonia.
- pluvialis fuscolineata* Alexander. — Patagonia.
- porysticta* (Philippi). — Chile.
- porrecta*, sp. n. — Peru.
- praeclara* Alexander. — Southeastern Brazil, northern Argentina.
- pugnax* Alexander. — Surinam.
- rapax* (Alexander). — Amazonian Peru.
- regifica* (Alexander). — Peru.
- repanda* Alexander. — Ecuador.
- reticulata* (Alexander). — Cuba, Mexico.
- roraimae* Alexander. — Venezuela.
- sanctae-martae* Alexander. — Colombia, Peru.
- sciasma*, sp. n. — Peru.
- seposita* Alexander. — Chile, Patagonia.
- sica* Alexander. — Panama.
- simulans concinna* (Williston). — Mexico and northwards.
- singularis* Alexander. — Ecuador.
- somnifica* Alexander. — Ecuador.
- splendidula* Alexander. — Bolivia.
- (*stictica* Blanchard, see *phatta*).
- subdomita* Alexander. — Southeastern Brazil.
- subreticulata* Alexander. — Ecuador.
- tragica* Alexander. — Mexico.
- trialbocincta* Alexander. — Panama.
- troglophila* Alexander. — Patagonia.
- umbrata* (de Meijere). — Cuba, Mexico, Amazonian Peru; (Oriental, Australasian).
- velasteguii* Alexander. — Ecuador.
- venustior*, sp. n. — Peru.
- villaricae* Alexander. — Paraguay.
- vorax* Alexander. — Panama.

Limonia (*Limonia*) *austera*, sp. n.

Belongs to the *eiseni* group; size large (wing, male, 11.5 mm.); praescutum reddish with a conspicuous black median stripe; posterior sclerites of notum and the dorsal pleurites blackened; femora brownish yellow, the tips narrowly blackened; wings brownish yellow, restrictedly patterned with brown; basal abdominal segments reddish brown, the subterminal segments blackened, hypopygium yellow; male hypopygium with the dorsal dististyle weak; rostral prolongation of the ventral dististyle narrowed to a slightly decurved point; gonapophysis with mesal-apical lobe long, its apex obliquely truncated.

Male. — Length, about 11 mm.; wing, 11.5 mm.

Rostrum and palpi black. Antennae black throughout; flagellar segments long-oval to subcylindrical, with short apical pedicels; terminal segment elongate, approximately one-half times or more longer than the penultimate. Head blackened, sparsely pruinose, especially adjoining the eyes; anterior vertex very narrow, about as wide as a single row of ommatidia.

Pronotum blackened above, more reddish laterally. Mesonotal praescutum reddish with a conspicuous median black stripe, the lateral pair lacking; posterior sclerites of notum blackened, the median region of scutum and the posterior sclerites more or less pruinose. Pleura and pleurotergite chiefly reddish, the dorsal pleurites conspicuously patterned with black. Halteres with stem pale, knob infuscated. Legs with the coxae reddened, the fore pair blackened basally; trochanters yellow; femora obscure brownish yellow, clearer yellow at base, the tips rather narrowly black, the amount subequal on all legs; tibiae obscure yellow, the tips more narrowly darkened; tarsi black; claws (male) each with a long basal spine. Wings with the ground brownish yellow, the prearcular and costal fields slightly more infuscated; a restricted darker brown pattern, including the oval stigma and seams at origin of *Rs*, cord, outer end of cell *1st M*₂ and fork of *Sc*; wing tip narrowly and weakly darkened; veins of basal half of wing yellow, of outer half brown. Venation: *Sc* long, *Sc*₁ ending about opposite three-fifths the length of *Rs*, *Sc*₂ at its tip; *Rs* gently arcuated at origin; free tip of *Sc*₂ lying slightly proximad of *R*₂, the short element thus preserved having about four trichia; cell *1st M*₂ a little longer than vein *M*₄; *m-cu* about one-fifth its own length beyond fork of *M*; vein *2nd A* sinuous on outer two-thirds.

Basal abdominal segments dark reddish brown, the fifth and succeeding segments black, forming a conspicuous subterminal ring; eighth segment brown basally, paling to yellow on apical third; hypopygium yellow. Male hypopygium (Fig. 14) with the tergite, *9t*, transverse, the caudal margin nearly truncate, the sparse setae marginal. Basistyle, *b*, long, the ventromesal lobe unusually low. Dorsal dististyle weak, lying in the notch of the small ventral dististyle, *vd*; rostral prolongation of the latter narrowed to a slightly decurved point; the two rostral spines close together at base of prolongation, surrounded by delicate setae; on mesal portion of style near base with a group of six long setae. Gonapophysis, *g*, with mesal-apical lobe long and

straight, its apex obliquely truncated, obtuse. Aedeagus, *a*, narrow, bilobed at apex.

Habitat: Peru.

Holotype, ♂, Chanchamayo, Junin, altitude 1200 meters, May 4, 1948 (Schunke).

Most similar to species such as *Limonia (Limonia) amazonica* (Alexander) and *L. (L.) optabilis* Alexander, which differ in the details of coloration and in the structure of the male hypopygia.

Limonia (Limonia) borinquensis, sp. n.

Belongs to the *eiseni* group; size large (wing, male, 9 mm.); general coloration yellow, the central region of the mesonotum more infuscated, especially behind; flagellar segments with very long unilaterally arranged verticils; thoracic pleura with a broad dark longitudinal stripe; fore femora obscure yellow, the tips narrowly darkened, remainder of legs brownish black; wings with a faint yellowish tinge, heavily patterned with brown; inner ends of cells R_3 and 1st M_2 lying far basad of cell R_5 ; abdominal segments conspicuously bicolored; male hypopygium with the rostral spines pale, widely separated; mesal-apical lobe of gonapophysis slender, simple.

Male. — Length, about 8 mm.; wing, 9 mm.; antenna, about 2 mm.

Rostrum and palpi black. Antennae with scape and pedicel black, flagellum a trifle paler; flagellar segments oval to long-oval, terminal segment a little exceeding the penultimate; verticils of unusual length, unilaterally arranged, a single one on each segment before midlength, the longest three to four times the segments. Head black; anterior vertex very narrow, more grayish pruinose.

Pronotum yellowish brown. Mesonotum yellow, the praescutum somewhat more darkened medially; scutal lobes, scutellum and postnotum brown. Pleura yellow, with a broad and conspicuous dorsal dark brown stripe, extending from the propleura to the root of the halteres; ventral sternopleurite likewise dark brown. Halteres with stem yellow, knob dark brown. Legs with the coxae and trochanters yellow; remainder of middle and posterior legs brownish black, the extreme femoral bases yellow; fore femora obscure yellow, the tips narrowly blackened. Wings with a faint yellowish tinge, the prearcular and costal fields more saturated yellow; a conspicuous dark brown pattern, as follows: Arculus and *h*; origin of *R*s from vein *R* almost to *M*; a smaller spot

in cell *R* at near mid-distance between the two last; fork of *Sc*; stigma; a broken seam over the cord; outer end of cell *1st M*₂; marginal spots at ends of veins, very large on veins *R*₃, *1st A* and *2nd A*, smallest at *M*₁₋₂; much paler seams in cell *Sc*₂ near margin and in axillary portion of cell *2nd A*; a vague dusky wash along vein *Cu* in cell *M*; veins brown, yellow in the brightened fields. Venation: *Sc* long, *Sc*₁ ending about opposite four-fifths the length of *Rs*, *Sc*₂ at its tip; *Rs* rectangular at origin; free tip of *Sc*₂ lying just beyond the transverse level of *R*₂; inner ends of cells *R*₃ and *1st M*₂ lying far before cell *R*₅, especially the former; cell *1st M*₂ elongate, nearly as long as distal section of *M*₁₋₂; *m-cu* just beyond fork of *M*; vein *2nd A* gently sinuous, cell *2nd A* relatively wide.

Abdomen bicolored, the bases of the segments yellow, the apices broadly dark brown, the latter becoming even more extensive on the outer segments; eighth segment chiefly pale; hypopygium with the basistyles and tergite infuscated, ventral dististyle chiefly yellow. Male hypopygium with the caudal margin of ninth tergite very shallowly emarginate, the lobes correspondingly broad and obtuse, with numerous stout setae. Ventromesal lobe of basistyle low. Dorsal dististyle a nearly straight rod, its apex more enlarged, acutely pointed, bent at a strong angle; basal third or more of style with appressed pale spinulae. Ventral dististyle fleshy, its total area less than that of the basistyle, deeply emarginate at base of rostrum, the latter flattened; a conspicuous setuliferous area near base of the prolongation, the two widely separated pale rostral spines placed within this area; space between the rostral spines a little less than their own length. Gonapophysis with mesal-apical lobe very slender, simple, blackened, the extreme tip slightly curved.

Habitat: Puerto Rico.

Holotype, ♂, El Yunque, Luquillo National Forest, among Sierra palms, *Euterpe globosa*, along stream, altitude 2600 feet, June 6, 1945 (H. D. Pratt).

The only approximately regional species are *Limonia (Limonia) caribaea* Alexander and *L. (L.) jamaicensis* (Alexander), the former being the closest. It differs in the small size, in all details of coloration of the body and wings, and in the structure of the male hypopygium, especially the gonapophyses.

Limonia (Limonia) euryleon, sp. n.

Belongs to the *eiseni* group; size medium (wing, female, over 8 mm.); general coloration of mesonotum shiny fulvous yellow, conspicuously patterned with black, including three praescutal stripes, the median one broad in front; scutal lobes black; femora yellow, with a narrow black subterminal ring; wings yellow, restrictedly patterned with brown; basal section of R_{4-5} elongate, about three-fourths R_{2-3} ; inner end of cell *1st M*₂ arcuated; abdominal segments black, the posterior borders broadly yellow; cerci slender.

F e m a l e. — Length, about 8.5 mm.; wing, 8.3 mm.

Rostrum black; basal segment of palpi yellow, outer segments darkened. Antennae with the scape and pedicel testaceous yellow, flagellum broken. Head gray, the front and anterior vertex more silvery; a conspicuous dark brown median area on posterior vertex; anterior vertex reduced to a narrow strip that is only a little wider than the diameter of a single row of ommatidia.

Pronotum brownish black medially, obscure yellow sublaterally, the lateral portions infuscated. Mesonotal praescutum shiny fulvous yellow, with three black stripes, the median area broad and conspicuous in front, gradually narrowed to a point before the suture; lateral praescutal stripes very narrow; scutal lobes blackened, the median area testaceous yellow; scutellum brownish black, the parascutella yellow; mediotergite brownish black, paler laterally, pleurotergite reddish yellow. Pleura with propleura and mesepisternum infuscated, forming a transverse girdle, the posterior pleurites testaceous yellow. Halteres yellow, knob infuscated. Legs with the coxae pale yellow, the fore pair weakly darkened basally; trochanters yellow; femora yellow, each with a narrow black subterminal ring that is a trifle wider than the yellow tips; tibiae yellow, the apex narrowly infuscated, the base even more vaguely so; tarsi obscure yellow, the terminal segments black. Wings (Fig. 10) yellow, the prearcular and costal fields somewhat deeper yellow; stigma oval, dark brown; a relatively conspicuous paler brown pattern, including spots at origin and fork of *Rs*, fork of *Sc*, cord and outer end of cell *1st M*₂, with other longitudinal washes along veins *M* and *Cu*, most outer veins and most of cell *2nd A*; veins light yellow, pale brown in the darkened portions. Venation: *Sc* long, *Sc*₁ ending a short distance before fork of *Rs*, much longer than *Sc*₂; *Rs* nearly square at origin, long-spurred; basal section of R_{4-5} very long, about three-fourths R_{2-3} , the inner end of cell R_3 lying

more basad than the other elements of the cord; inner end of cell 1st M_2 arcuated; $m-cu$ about one-fifth its own length before fork of M ; vein 2nd A gently sinuous.

Abdomen ringed with black and obscure yellow, the posterior borders being of the latter color, decreasing in amount on the subterminal segments; basal sternites and genital segment yellow. Ovipositor with cerci relatively short and very slender.

Habitat: Southeastern Brazil.

Holotype, ♂, Campo Bello, Rio de Janeiro, July 2, 1945 (J. F. Zikan).

Superficially the present fly is generally similar to species such as *Limonia* (*Limonia*) *optabilis* Alexander, differing in all details of coloration and venation. It is not closely related to species such as *L. (L.) immodica* Alexander, *L. (L.) indomita* Alexander, and *L. (L.) ingens* Alexander, all somewhat similar.

Limonia (*Limonia*) *felix*, sp. n.

Belongs to the *insularis* group; size very large (wing, female, over 18 mm.); general coloration dark brown; wings conspicuously patterned with pale brown, the veins broadly and conspicuously seamed with dark brown; costal border extensively yellow; an almost uninterrupted subterminal white band; Sc long, Sc_1 ending beyond the level of $r-m$; vein R_2 about one-half as long as the combined Sc_2-R_2 beyond it.

Female. — Length, about 15 mm.; wing, 18.5 mm.

Rostrum small, brownish black; palpi brownish black. Antennae brownish black, the outer flagellar segments paler; flagellar segments with short abrupt apical necks; outer segments more elongate and slender, the terminal segment about one-sixth longer than the penultimate; verticils elongate, on the more proximal portions longer than the segments, on outer two or three segments subequal to or a trifle shorter than the segments. Head dark brown, sparsely pruinose; anterior vertex narrow, with a prominent elevated ridge or crest that extends to between the antennal bases.

Thorax almost uniformly dark brown, the humeral region of praescutum a little brightened; posterior sclerites of notum very sparsely pruinose; praescutal vestiture sparse. Pleura dark brown, the ventral sclerites sparsely pruinose. Halteres brownish black. Legs with the coxae dark brown; trochanters obscure yellow; femora obscure yellow, with a narrow and conspicuous nearly terminal brown ring; tibiae and tarsi brownish yellow,

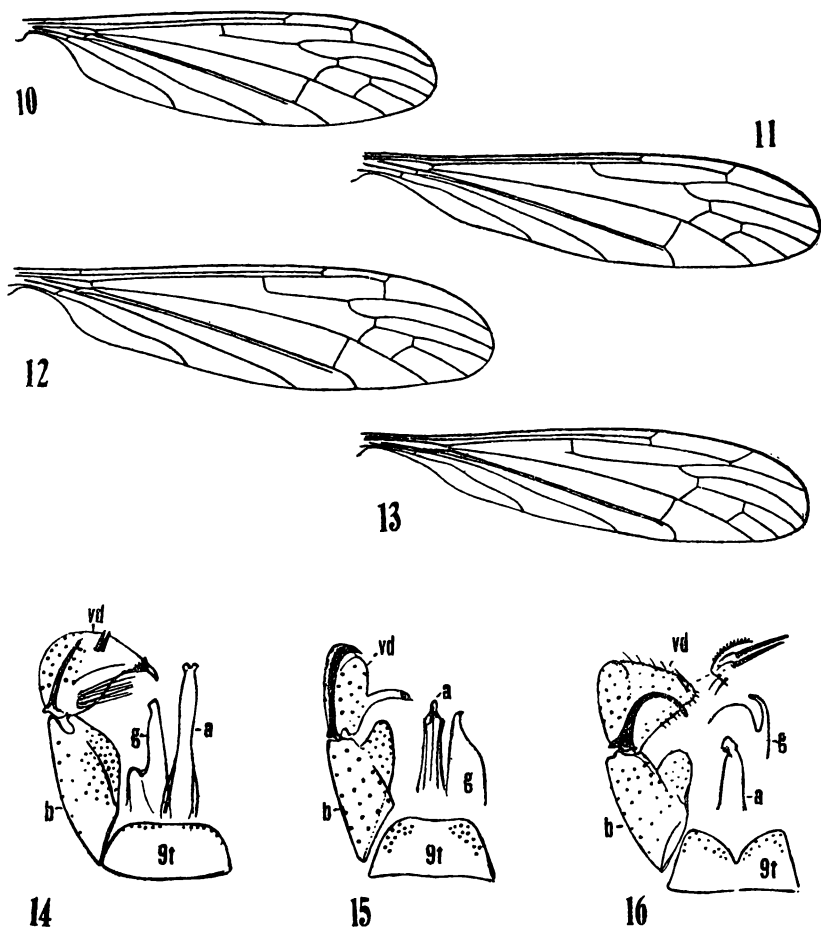


Fig. 10. *Limonia (Limonia) euryleon*, sp. n.; venation. — Fig. 11. *Limonia (Limonia) leucoscelsi*, sp. n.; venation. — Fig. 12. *Limonia (Limonia) porrecta*, sp. n.; venation. — Fig. 13. *Limonia (Limonia) sciasma*, sp. n.; venation. — Fig. 14. *Limonia (Limonia) austera*, sp. n.; male hypopygium. — Fig. 15. *Limonia (Limonia) leucoscelsi*, sp. n.; male hypopygium. — Fig. 16. *Limonia (Limonia) lydia*, sp. n.; male hypopygium. — (Symbols: *a*, aedeagus; *b*, basistyle; *g*, gonapophysis; *t*, tergite; *vd*, ventral dististyle).

the terminal tarsal segments darkened. Wings conspicuously patterned, the ground color of all but the costal border pale brown, heavily patterned with darker brown, appearing as seams to the veins; in the bases of cells beyond cord much heavier so as to restrict the ground color to delicate central streaks; centers of cubital and anal cells more extensively of the ground color; costal border almost to wing tip more yellowed, broken by darker seams beyond arculus, origin of R_s , Sc_2 , Sc_1 , stigma, and ends of veins R_3 and R_{4-5} ; a virtually complete and uninterrupted more whitened transverse band before the wing tip,

extending from cell R_2 to the posterior margin in cell $2nd\ M_2$; veins brown, yellowed in the brightened costal portions. Wing tip obtuse. Venation: Sc long, Sc_1 ending beyond level of $r-m$, Sc_2 still longer; vein R_2 about one-half as long as the combined Sc_2-R_2 beyond it; cell $1st\ M_2$ subequal to vein M_4 ; $m-cu$ shortly before fork of M .

Abdomen brown, the pleural membrane and posterior margins of the segments narrowly darker brown. Valves of ovipositor, especially the cerci, slender.

Habitat: Peru.

Holotype, ♀, Utcuyacu, Tarma, Junin, altitude 1600-3000 meters, March 5, 1948 (Woytkowski).

I take great pleasure in dedicating this fly to Felix Woytkowski, to whom our chief knowledge of the Tipulidae of Peru is due. This is the largest and finest member of the genus so far discovered in Tropical America. The only species with which it may be profitably compared is the smaller *Limonia (Limonia) pernobilis* Alexander, which has the venation and wing pattern quite distinct.

Limonia (Limonia) hesione, sp. n.

Belongs to the *eiseni* group; size large (wing, female, 12 mm.); thorax polished fulvous or yellow, the posterior part of mesonotum slightly more pruinose; halteres yellow, the apex of knob weakly darkened; legs black; wings with the ground fulvous, the costal and apical portions even more saturated; a restricted dark brown pattern; Sc long, Sc_1 ending a short distance before the fork of Rs ; $m-cu$ at fork of M .

Female. — Length, about 12 mm.; wing, 12 mm.

Rostrum and palpi black. Antennae black throughout; flagellar segments oval to long-oval, the segments well-separated; terminal segment longer than the penultimate. Front and anterior vertex silvery; posterior vertex dull black, very sparsely pruinose; anterior vertex reduced to a narrow strip.

Pronotum chiefly yellow, more infuscated on anterior half. Mesonotal praescutum and scutum polished fulvous; scutal lobes, scutellum and mediotergite darker brown, sparsely gray pruinose; posterior third of mediotergite more yellowed. Pleura and pleurotergite yellow. Halteres yellow, the apex of knob weakly infuscated. Legs with the coxae and trochanters light yellow; remainder of legs uniformly black. Wings with a strong fulvous ground, the costal border and wing tip more saturated fulvous; a restricted dark brown pattern, as follows: Origin of Rs , fork of Sc , free tip of Sc_2 and R_2 ; paler brown areas over cord, more expanded

over the anterior cord, outer end of cell 1st M_2 , and as marginal spots at ends of veins R_{4-5} to 2nd A , inclusive, that at R_{4-5} largest; cell R_3 with a weak brown suffusion or freckling; veins yellow, darker in the patterned portions. A few stigmal trichia, all basad of vein R_2 . Venation: Sc long, Sc_1 ending shortly before the fork of Rs , Sc_2 near its tip; inner end of cell R_3 arcuated; $m-cu$ at fork of M , about one-third longer than the distal section of Cu_1 .

Abdominal tergites one and two dark brown; succeeding segments chiefly greenish yellow, the posterior borders narrowly infuscated; sternites greenish yellow, the posterior portions reddish brown; genital shield obscure yellow; bases of hypovalvae blackened. Ovipositor with cerci small and slender, strongly upcurved; hypovalvae straight, reddish horn color.

Habitat: Peru.

Holotype, ♀, Fundo Sinchono, Huanuco, altitude 1500 meters, August 15, 1947 (Schunke).

Allied to *Limonia (Limonia) arrogantia* Alexander, *L. (L.) horrenda* Alexander, *L. (L.) huacapistanae* Alexander, and others, differing from all in the uniformly blackened legs, in conjunction with the large size.

Limonia (Limonia) jamaicensis Alexander

Limonia jamaicensis Alexander; Journ. N. Y. Ent. Soc., 34: 223-224; 1926.

The type was taken near Troy, Jamaica, in May, by Mr. A. E. Wight. The male hypopygium is shown (Fig. 17).

Limonia (Limonia) leucoscelis, sp. n.

Belongs to the *insularis* group; general coloration of praescutum orange-yellow, darkening on the sides; halteres brownish black; femora brown, the tips broadly blackened; tibiae dusky, the tips and the tarsi snowy white; claws (male) long and slender, each with two slender spines; wings with a strong brownish tinge, more intense on the cephalic third, with a restricted darker brown pattern; Sc_1 ending opposite midlength of Rs ; vein R_2 only a little shorter than the free tip of Sc_2 ; male hypopygium with the rostral prolongation of the ventral dististyle long and narrow, gently curved, the sensory area small, near the tip; apex of aedeagus small, simple.

Male. — Length, about 5.5 mm.; wing, 6 mm.

Type badly molded and body colors describable in general terms only. Rostrum and palpi dark brown. Antennae broken.

Mesonotal praescutum deep orange-yellow medially, darkening to brown on the sides; posterior sclerites of notum darker. Pleura pale yellow, the pleurotergite slightly darker. Halteres brownish black throughout. Legs with all coxae and trochanters pale yellow; femora brown, the tips broadly blackened and more or less dilated; tibiae dusky, with black setae, the tips broadly snowy white, including the setae, involving about the outer fifth or sixth of the segment; tarsi white, the setae of proximal portion of basitarsi more darkened, the remaining setae white; claws of male long and slender, each with two very slender spines, the one at near midlength about one-half longer than the basal spine. Wings (Fig. 11) with a strong brownish tinge, more intense on cephalic third, including the prearcular field; a restricted darker brown pattern, including narrow seams at origin of R_s , fork of Sc , cord, outer end of cell $1st M_2$, fork of R_{1-2} and less distinctly as marginal clouds at ends of the longitudinal veins, particularly of the medial field; veins brown, darker in the infuscated areas. Venation: Sc relatively long, Sc_1 ending about opposite midlength of R_s , Sc_2 at its tip; R_2 only a little shorter than the free tip of Sc_2 and in transverse alignment; R_s long, strongly arcuated at origin; cell $1st M_2$ pentagonal, m shortest; $m-cu$ about one-fifth its own length before the fork of M .

Abdomen brownish black, the hypopygium a trifle paler. Male hypopygium (Fig. 15) with the ninth tergite, $9t$, transverse, the caudal margin very slightly emarginate, the lobes correspondingly low and indistinct; about a dozen setae on either side, concentrated on the lobes. Basistyle, b , with ventromesal lobe largae, with long coarse setae. Dorsal dististyle a straight rod, the enlarged head bent at a right angle into a spine, the outer surface of style microscopically scabrous, as in the group. Ventral dististyle, vd , with main body bilobed near outer end to receive the dorsal dististyle; rostral prolongation long and narrow, gently curved, the sensory area small, placed near the tip. Gonapophysis, g , with mesal-apical lobe straight, the extreme tip a little curved. Aedeagus, a , slender, the simplex apex small.

Habitat: Peru.

Holotype, ♂, Cerro Azul, Upper Ucayali River, Loreto, April 20, 1947 (Schunke).

Allied to species such as *Limonia (Limonia) capnora* Alexander, *L. (L.) curraniana* Alexander, and others, differing in the leg pattern and in details of structure of the male hypopygium.

Limonia (Limonia) lydia, sp. n.

General coloration blackened, pruinose, the praescutum with a blackened median stripe; femora yellow, the tips rather narrowly blackened, preceded by a narrow clearer yellow ring; tibiae yellow, with both the base and apex very narrowly blackened; wings whitish, conspicuously patterned with brown, the markings chiefly peripheral in distribution; Sc_1 ending about opposite one-third the length of Rs ; abdomen black, the posterior borders of the segments narrowly silvery gray; male hypopygium with the tergite deeply emarginate; ventral dististyle more or less triangular in outline, the prolongation short and obtuse, the two spines near its tip.

Male. — Length, about 6 mm.; wing, 6.5 mm.

Rostrum, palpi and antennae black, the flagellar segments a trifle paler at the incisures, oval, the verticils short and inconspicuous. Head dark brown, light gray pruinose.

Pronotum and mesonotum blackened, pruinose, the praescutum with a conspicuous blackened median stripe. Pleura black, heavily pruinose, leaving areas of the ground on the propleura, anepisternum and elsewhere. Halteres short, stem yellow, knob brownish black. Legs with the coxae and trochanters black, the former pruinose; femora yellow, the tips rather narrowly and abruptly black, preceded by a vague narrow yellow subterminal ring; tibiae yellow, the extreme base and apex infuscated; proximal two tarsal segments yellow, the tips very narrowly darkened; remainder of tarsi dark brown; claws long, with a single spine at extreme base. Wings whitish, heavily patterned with brown, the markings chiefly peripheral in distribution, including a series of five or six costal darkenings and areas at ends of all longitudinal veins, largest on Cu , $1st A$ and $2nd A$; axilla narrowly clouded; other darkened areas over the cord and outer end of cell $1st M_2$ and as a series of about five confluent spots in cell R_3 ; conspicuous paler brown washes in bases of cells M , Cu and $1st A$; darkened spots at origin of Rs and at tip of Sc separated; prearcular and costal fields a trifle yellower than the remainder of ground; veins yellow in the ground areas, darker in the patterned portions. Venation: Sc relatively long, Sc_1 ending about opposite one-third the length of Rs , the latter long, more than three times the basal section of R_{4-5} ; free tip of Sc_2 and R_2 in transverse alignment; inner end of cell R_3 lying proximad of the other elements of the cord; cell $1st M_2$ a little longer than the distal section of vein M_{1-2} ; $m-cu$ just

before the fork of *M*; cell *2nd A* broad, the Anal veins approximated opposite arculus.

Abdomen black, the posterior borders of the segments narrowly silvery gray; hypopygium with the tergite and ventral dististyles obscure, basistyles conspicuously blackened. Male hypopygium (Fig. 16) with the caudal margin of the tergite, *9t*, deeply and narrowly emarginate, the lobes obliquely truncated. Basistyle, *b*, with ventromesal lobe stout, obtuse, simple, with long yellow setae. Dorsal dististyle a strongly curved sickle, its tip obtuse. Ventral dististyle, *vd*, smaller in area than the basistyle, more or less triangular in outline, the mesal portion sloping into the very short and obtuse prolongation; rostral spines two, placed close together on face of prolongation. Gonapophysis, *g*, with mesal-apical lobe long and slender, gently curved, separated from the body of the apophysis by a narrow notch. Aedeagus, *a*, glabrous, the tip a subtriangular lobe.

Habitat: Brazil.

Holotype, ♂, Boracea, São Paulo, altitude 800 meters, August 1947 (John Lane).

I am very pleased to name this attractive fly for Mrs. John Lane (Lydia Lane). It is very distinct from the other regional species that have the wings heavily patterned. In its general appearance it most resembles *Limonia (Limonia) indomita* Alexander but is entirely distinct. The reference of the fly to the subgenus *Limonia* is strictly on venational characters.

Limonia (Limonia) perpuncticosta, sp. n.

Size large (wing, female, 9 mm.); mesonotum variegated yellow, gray and brown; legs yellow, the femora with a relatively narrow pale brown subterminal ring; wings whitish subhyaline, with more than the anterior half heavily reticulate with brown, the posterior cells merely clouded or washed with pale brown; a series of about a dozen brown spots in cell *C*; *Rs* square and long-spurred at origin; *m-cu* before the fork of *M*; all valves of ovipositor unusually long and powerful.

Female. — Length, about 9 mm.; wing, 9 mm.

Rostrum fulvous brown; mouthparts and palpi black. Antennae with scape, pedicel and proximal one or two flagellar segments yellow, the succeeding segments passing into brownish black, becoming elongate-oval. Head brownish yellow, pollinose.

Pronotum large, light yellow. Mesonotal praescutum variegated yellow, gray and brown, the dark color appearing

chiefly as three confluent stripes and the lateral borders, the restricted pruinose part including the interspaces, reaching the margin at the humeri; scutum yellowish gray, the lobes extensively dark brown; scutellum light yellow, sparsely pruinose, narrowly dark brown at base; mediotergite dark brown on anterior half, paler brownish yellow behind; pleurotergite brown, darker ventrally. Pleura yellow, rather heavily whitish pruinose; an extensive brown cloud at the anterior spiracle and a small brown dot behind the fore coxa. Halteres yellow. Legs with the coxae and trochanters yellow, the fore pair slightly more darkened; remainder of legs yellow, femora with a relatively narrow pale brown subterminal ring, narrower than the yellow tip; terminal tarsal segments black. Wings whitish subhyaline, with more than the anterior half heavily reticulate with brown; major brown areas at arculus, at one-fourth and midlength of cell *R*, all reaching vein *M* behind, the first two likewise including cell *M*; a major area at stigma and over the anterior cord; a series of about a dozen brown spots in cell *C*, these slightly narrower than the interspaces; further costal darkenings as far distad as the wing tip; posterior cord and outer end of cell *1st M*₂ more narrowly seamed with brown; elsewhere in outer cells with further clouds, these chiefly backward extensions of the costal marks; cells *M*, *Cu* and the Anals merely washed with paler brown, heaviest as marginal clouds at ends of the veins and at midlength of cell *2nd A*; prearcular field chiefly pale yellow, including the veins; veins yellow, darker in the patterned areas. Venation: *Sc*₁ ending a short distance before fork of *Rs*, *Sc*₂ near its tip; *Rs* square and long-spurred at origin; *r-m* obliterated by the short fusion of veins *R*₄₋₅ and *M*₁₋₂; *m-cu* nearly one-half its length before the fork of *M*.

Abdomen chiefly yellow, the incisures of the more proximal sternites slightly more darkened. Ovipositor with all valves unusually long and conspicuous; cerci slender, gently upcurved; hypovalvae longer and more powerful, straight.

Habitat: Peru.

Holotype, ♀, Carpish, Huanuco, altitude 2800 meters, in dwarf fog forests, October 5, 1946 (Woytkowski).

The most similar species include *Limonia (Limonia) elegantula* Alexander, *L. (L.) splendida* Alexander, and *L. (L.) pampoecila* Alexander. Of these only the last has the series of costal darkened spots and further has the reticulate pattern distributed over the entire wing surface.

Limonia (Limonia) porrecta, sp. n.

Belongs to the *eiseni* group; general coloration blackish, including the appendages; flagellar verticils very long, unilaterally distributed; wings strongly tinged with brown, with a restricted darker brown pattern; *Sc* long, *Sc*₁ ending about opposite four-fifths the length of *Rs*; male hypopygium with the dorsal dististyle a long slender rod; ventral dististyle with the main body small, oval, the larger rostral prolongation with two stout pale spines on disk; two unusually long setae, arising from a common tubercle; gonapophysis with mesal-apical lobe porrect.

Male. — Length, about 7 mm.; wing, 7.2 mm.; antenna, about 1.7 mm.

Rostrum and palpi black. Antennae black throughout; basal flagellar segments oval, passing into long-cylindrical; segments with short abrupt apical necks, these less evident on the outer segments; longest verticils single on each segment, unilaterally distributed, very long, at midlength of organ exceeding three times the segments; terminal segment elongate, nearly twice the penultimate. Anterior vertex silvery gray, with a small median tubercle; at its narrowest point, vertex very reduced, only a trifle wider than the diameter of scape; posterior vertex and remainder of head black.

Pronotum black. Mesonotal praescutum dark liver brown to brownish black, the pretergites more yellowed; posterior sclerites of notum brownish black. Pleura black, the dorsal portion of the sternopleurite a trifle more brightened; dorsopleural region restrictedly yellow. Halteres blackened, the base of stem restrictedly yellow. Legs with the coxae dark brown, the fore pair somewhat paler, especially at tips; remainder of legs black, the incisures between the femora and tibiae very narrowly and insensibly more brightened; claws (male) long, with a very conspicuous spine at near midlength, with a few smaller spines nearer base. Wings (Fig. 12) with a strong brownish ground, restrictedly patterned with darker brown, as follows: Before and beyond stigma and on either side of the cord; less evident brightenings just before origin of *Rs*, at midlength of cell *Cu* and near base of cell *1st A*; veins brown. Venation: *Sc* long, *Sc*₁ ending about opposite four-fifths the length of *Rs*, *Sc*₂ near its tip; *Rs* square and short-spurred at origin; free tip of *Sc*₂ and *R*₂ in transverse alignment; basal section of *R*₄₋₅ arcuated, lying far before cells *R*₅ and *1st M*₂; cell *1st M*₂ subequal in length to vein *M*₄; *m-cu* shortly before the fork of *M*.

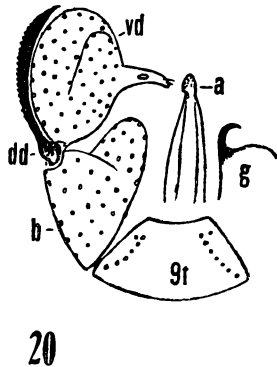
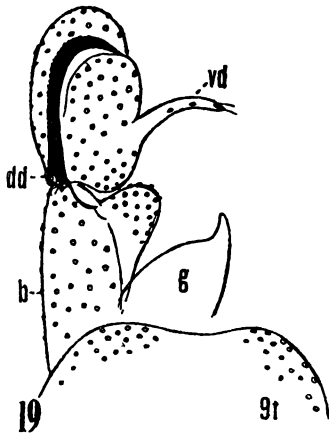
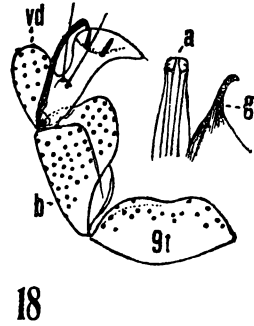
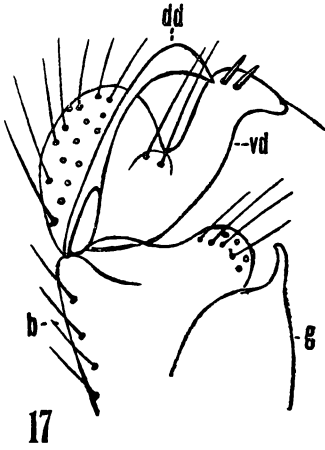


Fig. 17. *Limonia (Limonia) jamalcensis* Alexander; male hypopygium. — Fig. 18. *Limonia (Limonia) porrecta*, sp. n.; male hypopygium. — Fig. 19. *Limonia (Limonia) praeclara* Alexander; male hypopygium. — Fig. 20. *Limonia (Limonia) sclasma*, sp. n.; male hypopygium. — (Symbols: a, aedeagus; b, basistyle; dd, dorsal dististyle; t, tergite; vd, ventral dististyle).

Abdomen black; hypopygium black, the ventral dististyles yellow. Male hypopygium (Fig. 18) with the ninth tergite, *9t*, transverse, narrowed outwardly, the caudal margin gently emarginate and more or less thickened, the lobes with unusually long setae, the longest being virtually as long as the width of the tergite opposite their insertion. Basistyle, *b*, with the ventromesal lobe very stout, relatively low. Dorsal dististyle a slender sinuous rod, the tip decurved, acute. Ventral dististyle, *vd*, with the main body a small oval lobe, smaller than its rostral prolongation and much smaller than the basistyle; rostral blade

roughly triangular, with two stout pale spines on the disk; on face of style near the notch with a low tubercle that is tipped with an unusually long seta, with a second similar bristle near its base. Gonapophysis, *g*, with the mesal-apical lobe porrect, slender. Aedeagus, *a*, relatively broad at tip, evidently with paired orifices.

Habitat: Peru.

Holotype, ♂, Fundo Sinchono, Huanuco, altitude 1600 meters, August 5, 1947 (Schunke).

Generally similar to species such as *Limonia (Limonia) macintyreii* Alexander, differing in the details of coloration and venation, and in the structure of the male hypopygium.

Limonia (Limonia) praeclara Alexander

Limonia (Limonia) praeclara Alexander; Ann. Ent. Soc. America, 21: 636-637; 1928.

The type was from Iguazu Falls, Argentina, collected in October 1927, by Raymond and Elnora Shannon. The male hypopygium is shown (Fig. 19).

Limonia (Limonia) sciasma, sp. n.

Belongs to the *insularis* group; mesonotal praescutum pale brown, the sublateral regions more yellowed; halteres elongate, blackened; vestiture of fore legs and of costa in male unusually short; wings pale brown, with major brown spots and additional seams and washes; *Rs* long and straight, square and spurred at origin; vein *R*₁ bent strongly caudad, greatly reducing vein *R*₂; male hypopygium with the rostrum of the ventral dististyle long and narrow, its sensory area large, oval, placed at near midlength of the prolongation; gonapophysis with mesal-apical lobe strongly curved to the acute tip; apical lobe of aedeagus small.

Male. — Length, about 8 mm.; wing, 10 mm.

Rostrum and palpi black. Antennae black; basal flagellar segments oval, with conspicuous apical necks; succeeding segments more elongate, passing into cylindrical, with similar necks; terminal segment elongate, about one-third longer than the penultimate; longest verticils unilaterally distributed, subequal in length to the segments. Head black, more or less pruinose; anterior vertex reduced to a linear strip that is less than the diameter of two rows of ommatidia.

Pronotum infuscated. Mesonotal praescutum chiefly pale brown, the sublateral regions extensively more yellowed; posterior

sclerites of notum darker brown, the posterior part of the mediotergite more yellowed. Dorsal pleurites and pleurotergite dark brown, the ventral portions more yellowed. Halteres elongate, blackened, the base of stem restrictedly yellow. Legs with the coxae and trochanters reddish yellow, remainder of legs chiefly dark brown to brownish black; vestiture of legs abundant but very short, of the hind legs longer and more normal. Wings (Fig. 13) narrowed basally, the tip obtuse; ground color pale brown, with major darker brown spots at arculus, origin of *Rs*, fork of *Sc* and stigma; extensive brown washings over the anterior cord and wing tip, more or less connected over cell *R*₃; posterior cord and outer end of cell *1st M*₂ more narrowly seamed with brown; *Cu* and the veins beyond cord narrowly seamed with pale brown; costal area with the ground more yellowed, alternateing with the major brown areas, most distinct before the stigma; veins brown, a trifle more brightened in the yellow areas. Costal setae (male) very small but abundant. Venation: *Sc* long, *Sc*₁ ending about opposite four-fifths the length of *Rs* or beyond, *Sc*₂ near its tip; *Rs* long and straight, square and spurred at origin; vein *R*₁ bending strongly toward *R*₂₋₃, vein *R*₂ being much reduced, the free tip of *Sc*₂ correspondingly lengthened; cell *1st M*₂ subequal to the distal section of *M*₁₋₂; *m-cu* before the fork of *M*, longer than the curved distal section of vein *Cu*₁.

Abdomen, including hypopygium, dark brown to brownish black, the eighth segment and ninth tergite more yellowed. Male hypopygium (Fig. 20) with the tergite, *9t*, transverse, gradually narrowed behind, the caudal margin gently emarginate, each lateral portion with a group of very strong setae, arranged in a more or less distinct row. Dorsal dististyle with the serrulations of outer face very small to microscopic. Rostral prolongation of ventral dististyle, *vd*, long and narrow, its apex narrowly obtuse, before tip on upper margin with two strong setae; sensory area large, oval, at near midlength of prolongation, apparently bearing a single very strong spine. Gonapophysis, *g*, with mesal-apical lobe slender, strongly curved to the acute tip. Aedeagus, *a*, with the apical lobe small.

Habitat: Peru.

Holotype, ♂, Cerro Azul-Contamana, Loreto, April 27, 1947 (Schunke).

Most similar to species such as *Limonia (Limonia) grossa* Alexander and *L. (L.) multesignata* Alexander, differing in the coloration, wing shape, and in the structure of the male hypopygium.

Limonia (Limonia) venustior, sp. n.

Allied to *elegantula*; size large (wing, female, over 10 mm.); praescutum yellowish gray, irregularly patterned with dark brown; pleura with dorsal half black, the ventral half light gray pruinose; knobs of halteres dark brown; femora yellow, with a dark brown subterminal ring; wings whitish subhyaline, cell *R* and the outer radial and medial cells with an unusually heavy reticulated dark brown pattern; cells *C* and *Sc* uniformly brownish yellow; cells *Cu*, *1st A* and *2nd A* only slightly patterned with brown, not reticulate; cell *M* more yellowed, with three dark areas; *Sc*₁ ending about opposite two-thirds the length of *Rs*; cell *R*₃ widened on proximal third; *m-cu* more than one-third its length before the fork of *M*.

Female. — Length, about 9.5 mm.; wing, 10.2 mm.

Rostrum black, more pollinose at apex; mouthparts conspicuous; palpi dark brown; rostrum in direct alignment with the front. Antennae with scape and pedicel brownish black, basal half of flagellum reddish brown, the individual segments slightly darker outwardly, the outer segments brownish black; flagellar segments oval, slightly longer than the verticils. Head narrowly buffy or golden on anterior vertex, the posterior vertex darker, pruinose; a narrow dark brown central vitta on anterior vertex, narrowed to a point behind on the posterior vertex; anterior vertex about one-half wider than the diameter of scape.

Pronotum brown, heavily pruinose above. Mesonotal praescutum handsomely and irregularly variegated with dark brown and yellowish gray, the disk chiefly of the brown color, variegated by patches of the gray pollinose areas, the lateral praescutal borders more reddish brown; posterior sclerites of notum black, the central region of scutum and scutellum narrowly silvery gray; lateral borders of mediotergite and pleurotergite more reddened, the latter gray pruinose. Pleura with the dorsal half black, the ventral half heavily light gray pruinose, extending backward over the pleurotergite, as described. Halteres yellow, knob dark brown. Legs with the coxae black, sparsely pruinose; trochanters brownish black; femora yellow with a conspicuous dark brown subterminal ring, this broader than the yellow tip; tibiae and tarsi yellowish brown, the tips of the former darkened; tarsi chiefly black; claws (female) with about five teeth, the outermost at near midlength strongest. Wings with the ground whitish subhyaline, cell *R* and the outer radial and medial fields

with an unusually heavy dark brown reticulated pattern, the dark color exceeding the ground in area; cells *C* and *Sc* uniformly brownish yellow; cells *Cu* and the Anals restrictedly washed with brown at margins and at midlength of cell *1st A*; cell *M* more yellowed, with three dark areas, placed at base and apex and along vein *Cu* at near two-thirds the length; veins yellow, darker in the patterned areas. Venation: *Sc* long, *Sc*₁ ending about opposite two-thirds the length of *Rs*, *Sc*₂ near its tip; cell *R*₃ slightly more widened on proximal third; cell *1st M*₂ a little longer than vein *M*₄; *m-cu* more than one-third its length before fork of *M*; Anal veins gently convergent beyond the level of the arculus.

Abdominal tergites brownish yellow, clearer yellow across the tips, the lateral portions more darkened, sparsely pruinose; sternites more uniformly infuscated. Ovipositor with the valves reddish horn color; cerci slender, strongly upcurved.

Habitat: Peru.

Holotype, ♀, Sariapampa, Huanuco, altitude 3600 meters, in fog forest, May 12, 1946 (Woytkowski).

The most similar species are *Limonia (Limonia) elegantula* Alexander and *L. (L.) splendidula* Alexander, which differ in the venation and in the pattern of the legs and wings. All of these differ from *L. (L.) pampeocila* Alexander and certain allied forms, by the unpatterned costal field and the virtually unreticulated anal and cubital cells.

Neolimnobia Alexander

Neolimnobia Alexander; Proc. Linn. Soc. New South Wales, 52: 68; 1927; (type *diva* Schiner).

Neolimnobia is essentially a *Limonia* or *Dicranomyia* with a supernumerary crossvein in cell *R*₃ of the wings. Flagellar segments oval to elongate, with long conspicuous verticils. Claws unusually variable; in *diva* and allies, with strong spines, including two subequal unusually large outer ones and a further series of about five or six smaller denticles nearer the base. In still other species, including *hypocrita*, *immaculipes*, *pugilis*, and others, the spines are reduced to a single strong one at base. Wings in several species with an abundantly reticulated pattern. Male hypopygium of the subgenotype much as in species of *Dicranomyia*, particularly to species related to the Nearctic *humidicola* (Osten Sacken), that is, with a large fleshy ventral dististyle, short rostral prolongation, and with two approximated rostral spines. In still other members of the subgenus, the details of structure vary widely in the different species.

The dominant species is the subgenotype, *diva*, with its various races and color forms, widely distributed on the mainland and in the Greater Antilles. The leg pattern in the different species or varieties shows a range in arrangement and degree that is very difficult of explanation. In some, the femora have two dark rings, in others, at least on some of the legs, with three such rings. In still other individuals that are still referred to *diva*, the dark rings are broader and more diffuse, in extreme cases becoming so extensive as to obscure or eliminate the yellow interspaces.

Some of the species assigned to *Neolimnobia* below are so placed merely on the presence of a supernumerary crossvein in cell R_3 . Most of them are probably closer to the *repanda* group of the typical subgenus and their present position must be held as questionable. Such aberrant species include *interstitialis*, *orthogonia*, *paprzyckii* and *translucida*.

Nothing is known of the immature stages of species of *Neolimnobia*.

List of Species

- anthracopoda* Alexander. — Southeastern Brazil.
archangelica Alexander. — Southeastern Brazil.
corallina Alexander. — Ecuador.
diva (Schiner). — Antilles: Cuba, Puerto Rico; Mexico, Venezuela, Brazil.
excelsior Alexander. — Peru.
hypocrita Alexander. — Southeastern Brazil.
immaculipes Alexander. — Southeastern Brazil.
muscosa (Enderlein). — Ecuador.
interstitialis Alexander. — Ecuador.
orthogonia Alexander. — Ecuador.
paprzyckii Alexander. — Peru.
pugilis Alexander. — Ecuador.
translucida (Alexander). — Panama.
translucida nigrotincta Alexander. — Panama.
tricincta (Alexander). — Peru.

Discobola Osten Sacken

Discobola Osten Sacken; Proc. Ent. Soc. Philadelphia, p. 226; 1865; (type *annulata* Linnaeus, as *argus* Say).
Trochobola Osten Sacken; Mon. Dipt. N. America, 4: 97; 1869; (type *annulata* Linnaeus, as *argus* Say).

Discobola is essentially a *Limonia* possessing a supernumerary crossvein in cell *1st A*. In virtually all features the subgenus agrees closely with *Limonia* or *Dicranomyia*. Pteropleurite glabrous. Claws of male with a single spine of unusual length, placed shortly beyond one-third the length. Male hypopygium with two

pale rostral spines on the ventral dististyle, in the local species placed on the outer margin of the prolongation near the base, in certain exotic species placed on the main body of the style. Gonapophyses with the mesal-apical lobe and the body of the apophysis both unusually long and narrow, separated by a deep and broad notch. Wings of many of the species, including the local one, having an ocellate pattern.

The subgenus includes approximately 25 species that are chiefly Holarctic, Oriental and Australasian in distribution. Rather numerous species are found in eastern Asia, including Mindanao and Borneo, and again in New Zealand. Recently a species has been discovered in New Guinea and another in New Caledonia, bridging the former extensive gap between Asia and Australia. To this date no species has been found in the Ethiopian Region. A single species, *Limonia (Discobola) gowdeyi* Alexander, occurs in the Neotropical Region, to the present time being found only in the Greater Antilles (Cuba and Jamaica).

The immature stages of various species have been found in Europe, North America and New Zealand. The larvae occur in slimy tubes in the decaying wood of various coniferous and hardwood species of trees.

Rhipidia Meigen

Rhipidia Meigen; Syst. Besch., 1: 153; 1818; (type *maculata* Meigen).
Ceratostephanus Brunetti; Rec. Indian Mus., 6: 271; 1911; (type *antennata* Brunetti).
Monorhipidia Alexander; Bull. Brooklyn Ent. Soc., 8: 6; 1912 (type *fidells* Osten Sacken).
Arhipidia Alexander; Bull. Brooklyn Ent. Soc., 8: 6; 1912; (type *domestica* Osten Sacken).
Conorhipidia Alexander; Journ. N. Y. Ent. Soc., 22: 117; 1914; (type *conica* Alexander).

Rhipidia is essentially a weak modification of *Limonia*, based almost solely on the pectinae condition of the male sex. The group grades almost insensibly into *Limonia* and *Dicranomyia*.

As mentioned, the most distinctive single feature of the subgenus lies in the branched antennae in the male sex of many species. Somewhat comparable antennae are to be found in other subfamilies and tribes within the family, including the Hexatomini (*Gynoplistia*, Notes, V) and the Tipulinae (Notes, IX, X). Further, one species in an allied subgenus of *Limonia*, *Zelandoglochina* (Notes, VII) has comparable branched antennae.

The simplest form of antenna in *Rhipidia* is to be found in the *domestica* group, comprising the so-called *Arhipidia* type. Here the flagellar segments may be virtually simple, oval, with short apical necks that scarcely exceed one-fifth to one-sixth the total

length of the segment, a condition that is likewise found in the typical subgenus. From this primitive type the first modification is a slight lateral production of the segment to form a weak serration (as in *persimplex*, Fig. 21); *improperata*, *juninensis*, *paraguayana*, *pleuralis*, *pratti*, and others; slightly more accentuated in *domestica*, *schadei*, *schwarzi*, *simplicicornis*, *subterminalis*, and others, to produce a weak though distinct serrated appearance.) By a progressive elongation of this single lobe the species of the so-called *uniseriata* group (*Monorhipidia*) have been produced, with the flagellar segments short-unipectinate (as in *breviramosa*), the branch becoming longer until it may be approximately one to one and one-half times as long as the entire segment (as in *lais*, Fig. 22; *laetitarsis*, *pallatangae*, *surinamica*, *sybarita*, *syco-phanta*, *thysbe*, and others).

The most common and familiar type of antenna in males of this subgenus is the bipectinate, where in the different species a varying number of flagellar segments may be involved while the branches may range from short to very long, in the latter case producing a flabellate appearance (compare *phaon*, Fig. 23; *multiramosa*, Fig. 24). In *L. (R.) antennata* (Brunetti) of the Himalayas, all twelve flagellar segments are described and figured as being branched. Elsewhere and in the local fauna, never more than 11 such segments in any single species are yet known, these being produced in two different manners:

1. Many species have all but the last flagellar segment branched, as in *bruchiana*, *calverti*, *dotalis*, *multiramosa* (Fig. 24) and others.

2. In *polyclada* there are similarly eleven branched flagellar segments, only the first lacking such branches; the terminal segment bears two unequal branches that are widely separated, the shortest being at near midlength of the segment. Thus by a combination of types 1 and 2, all twelve flagellar segments may be branched, as described for *antennata*, above.

A very numerous category includes species with 10 branched segments, only the first and the last flagellar segments being simple (as in *aphrodite*, *cramptoni*, *flabelliformis*, *gracilirama*, *multifida*, *phaon*, *profana*, *succentiva*, *turritella*, and others). In the remaining species of this type there are commonly fewer branched segments, with one or two basal and one or more terminal segments without branches. Proportionate to the size of the antennae, the longest branches are to be found in species such as *gracilirama*.

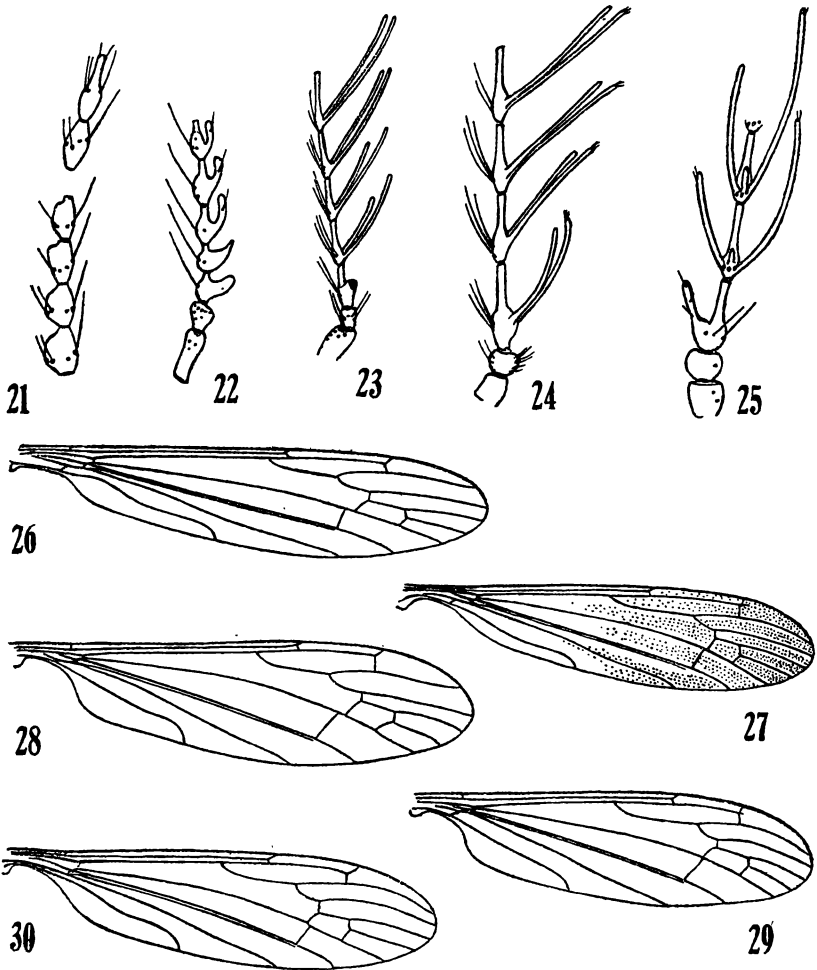


Fig. 21. *Limonia (Rhipidia) persimplex*, sp. n.; antenna, ♂ (flagellar segments 3-6, 11-12). — Fig. 22. *Limonia (Rhipidia) lais*, sp. n.; antenna, ♂ (basal seven segments). — Fig. 23. *Limonia (Rhipidia) phaon*, sp. n.; antenna, ♂ (basal seven segments). — Fig. 24. *Limonia (Rhipidia) multiramosa*, sp. n.; antenna, ♂ (basal six segments). — Fig. 25. *Limonia (Rhipidia) tripectinata* Alexander; antenna, ♂ (basal five segments). — Fig. 26. *Limonia (Rhipidia) lais*, sp. n.; venation. — Fig. 27. *Limonia (Rhipidia) mordax*, sp. n.; venation. — Fig. 28. *Limonia (Rhipidia) persimplex*, sp. n.; venation. — Fig. 29. *Limonia (Rhipidia) phaon*, sp. n.; venation. — Fig. 30. *Limonia (Rhipidia) tiresias*, sp. n.; venation.

While bipectination is virtually the culmination of branching of the antennae, a few species show an approach to tripectination in having a pair of usually very long branches, with a much reduced third branch or spur at the base (as in *tripectinata*, Fig. 25). Among species showing such unequal tripectination some, as *nigrorostata*, have this spur very tiny to scarcely apparent, being barely indicated by a small tubercle; the longest such spur known to date is a little less than the length of the basal

enlargement. Various species have the first flagellar segment bearing a single long branch, while segments two to eleven, inclusive, show the tripectinate appearance as described. In *proliferata* there are only eight branched segments, the two longer branches relatively short but with the third or spur distinctly indicated. Species that show tripectination include *commelina*, *inaequipectinata*, *invaripennis*, *longurio*, *nigrorostrata*, *proliferata*, *tripectinata*, and others.

In females of the local species of *Rhipidia*, with a single exception as known, the maximum of branching is the accentuated subpectinate type, that is, only slightly and simply produced. In *myriosticta*, however, the female antenna has seven conspicuous short-bipectinate segments, with the longest branches exceeding the segments in length. The male of this species is unknown and the degree of pectination in this sex cannot be stated.

Male hypopygium in the local species commonly with two rostral spines. In various Holarctic species these may number 7 or 8, or even more. The pteropleurite usually bears setae.

The center of distribution of *Rhipidia* is in Tropical America, as shown by the numerous species listed below. Elsewhere there are a relatively few species in the Holarctic, Ethiopian and Oriental Regions, with a bare indication in the extreme western Australasian Region.

As indicated under the general account earlier, the immature stages of species of this subgenus frequent a wide range of habitats, the more common being in decaying vegetable matter and in fermenting sap, and again in decaying wood where the larvae frequent the damp powdery materials beneath the bark of prostrate trees of various hardwood species, including *Fagus*, *Quercus* and *Populus*. In the vastly developed Neotropical fauna, various modifications of the larval habitat, as described, may be expected.

List of Species

- agglomerata* (Alexander). — Mexico.
annulicornis (Enderlein). — Colombia, Venezuela, British Guiana, Brazil, Ecuador, Paraguay.
aphrodite Alexander. — Peru.
banosensis Alexander. — Ecuador.
bipectinata (Williston). — Lesser Antilles: St. Vincent.
breviramosa Alexander. — Southeastern Brazil.
breviramosa towarensis Alexander. — Venezuela.
bruchiana Alexander. — Venezuela, Brazil, Paraguay, Argentina.
calverti (Alexander). — Costa Rica.
cassandra Alexander. — Southeastern Brazil.
commelina Alexander. — Mexico.

- complexa*, sp. n. — Peru.
conica Alexander. — British Guiana.
conica turrifera Alexander. — Venezuela.
(costalis Williston, see *willistoniana*).
costaloides (Alexander). — Panama.
cramptoni (Alexander). — Northern Brazil.
cytherea Alexander. — Peru.
domestica (Osten Sacken). — Cuba, Jamaica, Puerto Rico, Lesser Antilles, Venezuela, Brazil; Nearctic.
domestica amazonensis (Alexander). — Amazonian Brazil.
domestica angustifrons (Alexander). — Ecuador.
dotalis Alexander. — Ecuador.
eliana, sp. n. — Southeastern Brazil.
flabelliformis Alexander. — Panama, Venezuela, Peru.
flabelliformis brachynema Alexander. — Southeastern Brazil.
flabelliformis brevifila Alexander. — Ecuador.
gracilirama Alexander. — Mexico.
gracilirama lassula Alexander. — Mexico.
guerrerensis Alexander. — Mexico.
hirtilobata Alexander. — Mexico.
improperata Alexander. — Southeastern Brazil.
inaequipectinata Alexander. — Northern Argentina.
ingenua Alexander. — Costa Rica.
invaripennis Alexander. — Peru.
invaripennis carpapatae Alexander. — Peru.
jubilata Alexander. — Ecuador.
juninensis Alexander. — Peru.
laetitarsis Alexander. — Southeastern Brazil.
lais, sp. n. — Peru.
latilutea Alexander. — Southeastern Brazil.
leda Alexander. — Peru.
longispina Alexander. — Mexico, Costa Rica.
longurio Alexander. — Southeastern Brazil.
luquilloensis, sp. n. — Puerto Rico.
luxuriosa Alexander. — Colombia.
melanaria Alexander. — Peru.
microsticta (Alexander). — Southeastern Brazil, northern Argentina.
monoxantha Alexander. — Venezuela.
mordax, sp. n. — Peru.
multifida Alexander. — Mexico.
multiguttata (Alexander). — Guatemala, Panama.
?multipunctata (Fabricius). — South America.
multipunctigera Alexander. — Ecuador.
multiramosa, sp. n. — Southeastern Brazil.
myriosticta Alexander. — Ecuador, Peru.
mystica Alexander. — Colombia.
neglecta Alexander. — Southeastern Brazil.
neglecta subneglecta Alexander. — Southeastern Brazil.
nigrostrata Alexander. — Southeastern Brazil.
nigrostrata muzoensis Alexander. — Colombia.
nobilissima Alexander. — Peru.
ocellana Alexander. — Southeastern Brazil.
pallatangae Alexander. — Ecuador.
paraguayana Alexander. — Paraguay.
paulus Alexander. — Venezuela.
perarmata (Alexander). — Peru.

- persimplex*, sp. n. — Peru.
phaon, sp. n. — Peru.
pleuralis (Alexander). — Mexico, Panama, Colombia.
polyclada Alexander. — Ecuador.
pratti, sp. n. — Puerto Rico.
proctigerica, sp. n. — Southeastern Brazil.
profana Alexander. — Peru.
proliferata Alexander. — Mexico.
(punctipennis Alexander, see *punctoria*).
punctoria Alexander. — Costa Rica, Peru.
schadei Alexander. — Southeastern Brazil, Paraguay.
schwartzi (Alexander). — Southern Florida, Cuba, Venezuela.
sejugata Alexander. — Mexico.
simplicicornis Alexander. — Southeastern Brazil.
sprucei Alexander. — Ecuador.
stonei Alexander. — Colombia.
subcostalis (Alexander). — Jamaica, Costa Rica.
subpectinata (Williston). — Lesser Antilles: Grenada, St. Vincent.
subterminalis Alexander. — Southeastern Brazil, northern Argentina.
succentiva Alexander. — Peru.
superarmata Alexander. — Peru.
surinamica Alexander. — Surinam.
sybarita Alexander. — Ecuador.
sycophanta Alexander. — Ecuador.
tabescens (Enderlein). — Southeastern Brazil.
tetraleuca Alexander. — Puerto Rico.
thysbe Alexander. — Peru.
tiresias, sp. n. — Peru.
tridigitata Alexander. — Ecuador.
tripectinata Alexander. — Colombia.
turitella Alexander. — Ecuador, Peru.
unipectinata (Williston). — Lesser Antilles: St. Vincent.
uxor Alexander. — Peru.
vafra Alexander. — Ecuador, Peru.
variicosta Alexander. — Panama.
(vicina Alexander, see *luxuriosa*).
willistoniana Alexander. — Lesser Antilles: Dominica, St. Vincent.

Limonia (*Rhipidia*) *complexa*, sp. n.

Allied to *perarmata*; mesonotum chiefly buffy, the praescutum with a more reddish brown median stripe; posterior sclerites of notum chiefly infuscated; pleura obscure yellow, striped longitudinally with darker; antennae (male) with ten long-bipectinate flagellar segments; legs brown, the femoral bases obscure yellow; wings weakly patterned with brown on a paler ground; male hypopygium with the proctiger greatly developed and modified, appearing as a massive blackened structure jutting beyond the other elements of the hypopygium; rostral prolongation of the ventral dististyle long and slender, the two spines at near midlength, long and straight, directed basad; lobe at base of aedeagus bearing several strong setae.

Male. — Length, about 8 mm.; wing, 8 mm.; antenna, about 3.8 mm.

Rostrum and palpi black. Antennae (male) large, nearly one-half as long as body, with ten long-bipectinate flagellar segments; longest branch (about flagellar segment six or seven) approximately three times the segment; first flagellar segment with a single short branch that is slightly more than one-half the segment; second segment with the branches unequal, the longest nearly three times the segment, the shorter one only about one-fourth longer than the segment; on the third and succeeding segments the branches are unequal but the discrepancy between the two is gradually reduced so that the outer branches are virtually equal in length; eleventh flagellar segment with the branches virtually equal and approximately twice the segment; terminal segment simple; besides the two major branches, the segments bear a small fingerlike spur, very small on flagellar segment two, reaching its maximum development on segments six to eight, thence becoming progressively smaller, still evident on segment ten but lacking on the eleventh segment; antennae black, pedicel a little paler; apical stems of the segments abruptly whitened, the terminal segment uniformly darkened; longest verticils subequal in length to the segments. Head dark gray; anterior vertex reduced to an extensive linear strip that is scarcely one-half as wide as a single row of ommatidia.

Pronotum brown. Mesonotal praescutum chiefly buffy, with a more reddish brown median stripe that is darker colored before the suture; lateral stripes scarcely indicated; posterior and lateral portions of praescutum slightly pruinose; posterior sclerites of notum chiefly infuscated. Pleura obscure yellow, sparsely pruinose, striped longitudinally with brown, most evident as a ventral stripe along the dorsal sternopleurite and bases of coxae; propleura and adjacent regions likewise darkened. Halteres infuscated, the base of stem narrowly yellow. Legs with the coxae yellow, the basal half darkened, as described; trochanters yellow; remainder of legs brown, the femoral bases obscure yellow. Wings with a weak brown tinge, restrictedly patterned with darker brown, most evident as clouds at origin and fork of *Rs*, fork of *Sc*, and stigma, with less distinct seams over the anterior cord; a more extensive but slightly paler clouding near wing tip; costal and subcostal interspaces more yellowed; veins brown, yellow in the costal interspaces. Venation: *Sc* long, *Sc*₁ ending about opposite three-fifths the length of *Rs*, *Sc*₂ at its tip; *Rs* long, angulated and

short-spurred at origin; cell *1st M*₂ subequal in length to vein *M*₄; *m-cu* close to the fork of *M*.

Abdomen elongate, segments bicolored, the tergites obscure yellow with the caudal borders narrowly dark brown; basal sternites somewhat clearer yellow; outer abdominal segments more uniformly infuscated; hypopygium brown, the enlarged proctiger blackened. Male hypopygium (Fig. 31) with the tergite, *9t*, transverse, narrowed outwardly, the lobes low with abundant long setae. Proctiger, *pr*, conspicuously developed, jutting caudad beyond all other elements of the hypopygium, blackened, shaped about as figured. Basistyle, *b*, small, the ventromesal lobe long and slender, at apex further narrowed into a long fingerlike point, with a small lateral tubercle at point of narrowing. Dorsal dististyle an unusually slender curved rod, narrowed to the acute tip. Ventral dististyle, *vd*, slightly exceeding the basistyle in area, with a conspicuous lateral lobule, in the notch of which the dorsal style lies; rostral prolongation long and slender, yellow, strongly curved, narrowed to the tip; rostral spines two, placed at near midlength of outer margin, long and straight, directed basad. Gonapophysis with mesal-apical lobe slender, straight, the main body of the apophysis produced into a long ribbonlike extension, the tip more widened and darkened. Aedeagus, *α*, on either side at base with a strong lobe that bears several setae.

Habitat: Peru.

Holotype, ♂, Utcuyacu, Tarma, Junin, February 9, 1947 (Woytkowski).

This fly is most closely allied to *Limonia (Rhipidia) perarmata* Alexander and *L. (R.) superarmata* Alexander, all agreeing in the size and general structure of the massively developed proctiger, differing in all details of structure of the male hypopygium.

Limonia (Rhipidia) eliana, sp. n.

Size small (wing, male, 5.5 mm.); mesonotum chiefly dark brown, the pleura blackened dorsally, abruptly yellow beneath; antennae (male) with bipectinate segments; wings with a strong blackish tinge, unpatterned; male hypopygium with the proctiger inconspicuous; basistyle with ventromesal lobe simple, obtuse at tip; ventral dististyle relatively small, the rostral prolongation pale, obtuse at tip; rostral spines two, placed close to midlength of the outer margin.

Male. — Length, about 5.5 mm.; wing, 5.5 mm.

Female. — Length, about 5.5 mm.; wing, 5-5.2 mm.

Rostrum and palpi black. Antennae (male) black throughout, broken at the tenth segment; flagellar segments two to eight, inclusive, each with two relatively long branches, the longest (about flagellar segments four or five) about one-half longer than the segment, the branches with unusually coarse setulae; first flagellar segment oval, abruptly narrowed into a stem that is subequal in length. Head brown; anterior vertex narrow.

Pronotum dark brown. Mesonotum chiefly dark brown, the broad praescutal borders a little paler. Pleura with a conspicuous dark brown dorsal stripe, extending from the prothorax to the base of the abdomen; ventral pleurites and sternum, including all coxae, abruptly obscure yellow. Halteres brownish black, the base of stem obscure yellow. Legs with the coxae as described; trochanters yellow; femora brown, paler basally; tibiae and tarsi paler, more whitened, the outer tarsal segments black; claws relatively small, with a conspicuous outer tooth and about two smaller denticles. Wings with a strong blackish tinge, unpatterned except for the oval, slightly darker brown stigma; veins and trichia brown; macrotrichia of veins long and conspicuous. Venation: Sc_1 ending about opposite two-fifths the length of R_s , Sc_2 near its tip; free tip of Sc_2 and R_2 pale, in transverse alignment, vein R_{1-2} jutting beyond as a long spur that is provided with several trichia; inner end of cell $1st M_2$ lying proximad of cell R_5 ; cell $1st M_2$ nearly as long as vein M_4 ; $m-cu$ about one-fourth its length beyond the fork of M .

Abdominal tergites dark brown; basal sternites light yellow, the incisures narrowly darkened, more broadly so in female; remainder of abdomen, including hypopygium, dark brown. Male hypopygium (Fig. 32) with the tergite, $9t$, transverse, narrowed posteriorly; proctiger an inconspicuous pale transverse extension of the tergite. Basistyle, b , with the ventromesal lobe obtuse, as normal in the subgenus, with a small obtuse lobule on the side. Dorsal dististyle a strong blackened rod, narrowed into a long straight apical spine. Ventral dististyle, vd , relatively small, its total area less than that of the basistyle; rostral prolongation pale, the tip obtuse, with two long pale setae; rostral spines two, arising from low tubercles placed on the outer margin of the prolongation close to midlength. Gonapophysis, g , with mesal-apical lobe blackened, at apex narrowed into a point. Aedeagus relatively broad, with small lateral points or shoulders.

Habitat: Southeastern Brazil.

Holotype, ♂, Armadillo, near Angra dos Reis, Rio de Janeiro, altitude 10 meters, July 30, 1945 (Lauro Travassos Filho). Allotopotype, ♀, August 4, 1945. Paratopotype, 1 ♀, pinned with the allotype.

This distinct fly is named for Miss Eliana Travassos, daughter of Lauro and Betty Travassos. Although superficially very similar to *Limonia* (*Rhipidia*) *proctigerica*, sp. n., the present fly differs very conspicuously in the structure of the male hypopygium.

Limonia (*Rhipidia*) *inaequipectinata* Alexander

Limonia (*Rhipidia*) *inaequipectinata* Alexander; Ann. Ent. Soc. America, 22: 772-773; 1929.

The type was from Iguazu Falls, Argentina, collected in October 1927, by Raymond and Elnora Shannon. The male hypopygium is shown (Figs. 35, 35A).

Limonia (*Rhipidia*) *lais*, sp. n.

Size large (wing, male, 10 mm.); general coloration of mesonotum orange, the posterior sclerites more darkened; flagellar segments short-unipectinate; legs yellow, the outer tarsal segments blackened; wings buffy yellow, very restrictedly patterned with brown; *Sc* short, *Sc*₁ ending just beyond one-fourth the length of *Rs*; cell 1st *M*₂ long and narrow; male hypopygium with the dorsal dististyle stout; ventral dististyle very large and fleshy, its area exceeding three times that of the basistyle; rostral prolongation short and stout, the two spines placed close together.

Male. — Length, about 8 mm.; wing, 10 mm.

Rostrum unusually long and stout, approximately one-half the remainder of head, dark brown; palpi black. Antennae black, the apical stems of the flagellar segments paler; antenna broken beyond the tenth segment (Fig. 22, showing basal seven segments); pedicel with numerous long setae, including a subterminal row of five or six strong ones; first two flagellar segments strongly produced on outer face, the lobes fully twice the short apical stems; succeeding segments with the branch still longer to produce a unipectinate appearance, the branch extending to or slightly beyond the apex of each segment; on the eighth segment the branch is slightly longer, on the succeeding ones becoming shorter; presumably the branches will be found to occur in such a diminishing degree on all the outer segments excepting the last; glabrous apical stems of the intermediate segments long, fully one-third the enlarged base. Head buffy, sparsely pruinose;

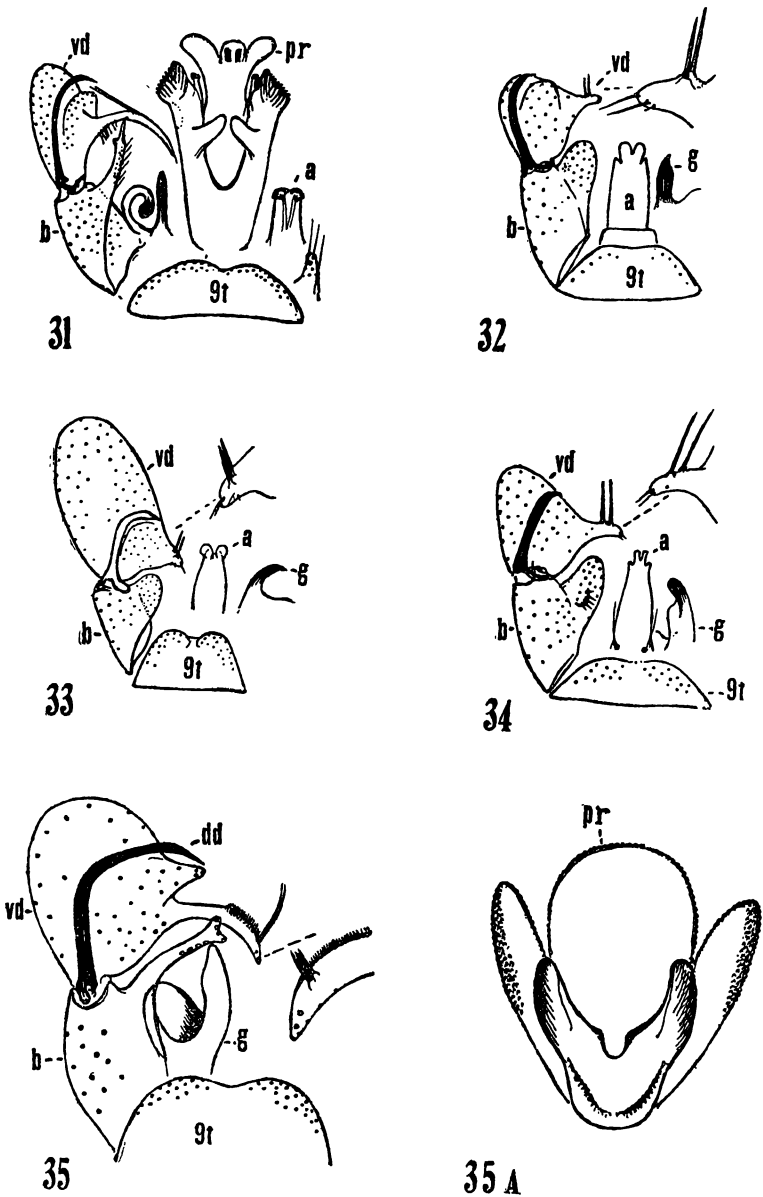


Fig. 31. *Limonia (Rhipidia) complexa*, sp. n.; male hypopygium. — Fig. 32. *Limonia (Rhipidia) eliana*, sp. n.; male hypopygium. — Fig. 33. *Limonia (Rhipidia) lats*, sp. n.; male hypopygium. — Fig. 34. *Limonia (Rhipidia) lucilloensis*, sp. n.; male hypopygium. — Fig. 35, 35A. *Limonia (Rhipidia) inaequipectinata* Alexander; male hypopygium. — (Symbols: a, aedeagus; b, basistyle; dd, dorsal dististyle; g, gonapophysis; pr, proctiger; t, tergite; vd, ventral dististyle).

anterior vertex reduced to a narrow strip that is a little wider than two rows of ommatidia.

Pronotum deep orange. Mesonotal praescutum and scutum orange, the humeral region of the former more yellowed; scutellum testaceous yellow; mediotergite with the central portion slightly infuscated, the sides broadly more yellowed; pleurotergite weakly pruinose. Pleura weakly darkened and sparsely pruinose, narrowly lined longitudinally with brown, including a stripe from the propleura to the root of the halteres and a more ventral one near lower portion of the sternopleurite; a vague incomplete similar stripe on the dorsal sternopleurite. Halteres with stem yellow, knob infuscated. Legs with the coxae buffy yellow, vaguely lined with brown on outer faces; trochanters yellow; a single leg (middle) remains, uniformly yellow, the fourth and fifth tarsal segments, with the apex of the third, blackened. Wings (Fig. 26) with the ground buffy yellow, very restrictedly patterned with brown, appearing as narrow seams or spots at origin of *Rs*, fork of *Sc*, *R*₂, cord and outer end of cell *1st M*₂, and as exceedingly faint marginal darkenings at ends of the longitudinal veins; veins yellow, darker in the patterned areas. Venation: *Sc* relatively short, *Sc*₁ ending just beyond one-fourth to nearly opposite one-third the length of *Rs*, *Sc*₂ at its tip; cell *1st M*₂ long and narrow, a trifle longer than vein *M*₄; *m-cu* about one-third its length before the fork of *M*.

Abdominal tergites buffy yellow, the sternites somewhat clearer yellow. Male hypopygium (Fig. 33) with the tergite, *9t*, unusually long, narrowed outwardly, terminating in conspicuous rounded lobes; vestiture long but pale and inconspicuous. Basistyle, *b*, with the ventromesal lobe large, without lateral tubercles, some of the outer setae very long. Dorsal dististyle relatively stout, its apex suddenly narrowed into a straight spine. Ventral dististyle, *vd*, very large and fleshy, the area exceeding three times that of the basistyle, the vestiture pale and inconspicuous; rostral prolongation short and stout, the apex truncated; rostral spines two, placed close together, straight, the tips acute. Gonapophysis, *g*, with mesal-apical lobe blackened, the tip suddenly narrowed into a spinous point.

Habitat: Peru.

Holotype, ♂, Sariapampa, Huanuco, altitude 3600 meters, in fog forest, May 2, 1946 (Woytkowski).

This species has somewhat the general appearance of *Limonia* (*Rhipidia*) *domestica* (Osten Sacken) and some allied regional forms.

The unipectinate antennae, large size, and all details of coloration of the body and wings, all separate the fly from other generally similar species.

Limonia (Rhipidia) luquilloensis, sp. n.

Allied to *willistoniana*; mesonotum reddish brown, not clearly patterned, the pleura darker brown; antennae (male) with seven bipectinate segments, the longest branch about one-half longer than the segment; femora brown, the tips narrowly obscure yellow; wings chiefly pale brown, on the cephalic half slightly variegated with obscure yellow ground areas; male hypopygium without a developed proctiger; ventromesal lobe of basistyle bearing a small lateral lobule; rostral prolongation of ventral dististyle obtuse at tip, the two slightly separated spines arising from small basal tubercles.

Male. — Length, about 5-6 mm.; wing, 5-6 mm.; antenna, about 1.4-1.6 mm.

Female. — Length, about 5-6.5 mm.; wing, 5-6 mm.

Rostrum dark brown; palpi black. Antennae (male) with seven bipectinate segments, involving flagellar segments two to eight, inclusive, the longest branches about one-half longer than the segments; first flagellar segment merely produced, flagellar segment nine with a single branch that is a little shorter than the segment; segments ten and eleven with progressively smaller single lobes or tubercles; terminal segment simple, elongate; longest verticils very long, approximately twice the segments; antennae black, including the branches, the apices of the necks a trifle paler. In the female, flagellar segments merely produced, with abrupt apical necks, to give a nodulose appearance. Head brownish gray; anterior vertex narrow, in male about as wide as two or three rows of ommatidia.

Cervical region dark brown; pronotum and mesonotum reddish brown, not clearly patterned. Pleura darker brown, paler on the ventral sternopleurite. Halteres infuscated, the extreme base of the short stem brightened. Legs with the coxae and trochanters yellow, the fore coxae somewhat darker; femora obscure yellow basally, becoming darker outwardly, the tips narrowly obscure yellow; tibiae brown, narrowly brightened at bases; tarsi brown, the outer segments darker; claws elongate, with a single long spine near base. Wings chiefly pale brown, the posterior half almost uniformly so; cephalic half with the darker brown markings interrupted by slightly more restricted

obscure yellow ground areas; the five chief darkenings lie beyond the arculus, at midlength of *R*, origin of *Rs*, fork of *Sc*, and at stigma; of the pale ground areas in the posterior half of wing, the most conspicuous lie in cells *1st M*₂, base of *2nd M*₂, on both sides of *m-cu* and at end of vein *2nd A* in cell *1st A*; veins brown. Venation: *Sc*₁ ending about opposite midlength of *Rs*, *Sc*₂ near its tip; inner end of cell *R*₃ lying basad of either *R*₅ or *1st M*₂; cell *1st M*₂ nearly as long as the distal section of vein *M*₃; *m-cu* variable in position, from about one-fourth its own length before the fork of *M* to a corresponding distance beyond this point.

Abdominal tergites dark brown, the incisures slightly deeper in color; basal sternites yellow, the incisures weakly darkened, the outer segments and hypopygium passing into brown. Male hypopygium (Fig. 34) with the tergite, *9t*, transverse, narrowed outwardly, the proctiger undeveloped; posterior border of tergite only slightly emarginate, the lobes very low, with abundant long setae. Basistyle, *b*, subequal in area to the ventral dististyle; ventral mesal lobe with a small lateral lobule on basal half. Dorsal dististyle nearly straight, narrowed into an acute terminal spine. Ventral dististyle, *vd*, with the rostral prolongation conspicuous, obtuse at tip; the two rostral spines arise from small basal tubercles placed near or beyond midlength of the prolongation, spines long, nearly equal to the prolongation itself. Gonapophysis, *g*, with mesal-apical lobe obtuse at tip, with a conspicuous lateral flange on outer margin before apex. Aedeagus with a small lateral point or shoulder on either side before the bifid apex; two powerful setae at base of aedeagus.

Habitat: Puerto Rico.

Holotype, ♂, El Yunque, Luquillo National Forest, altitude 2000 feet, along stream in growth of Sierra palms, *Euterpe globosa*, November 27-28, 1943, at light (Pratt and Maldonado). Allotopotype, ♀. Paratopotypes, several of both sexes.

Very close to *Limonia (Rhipidia) willistoniana* Alexander, of which it may prove to be only a race. It differs in the details of coloration and structure of the male hypopygium.

Limonia (Rhipidia) mordax, sp. n.

General coloration of praescutum yellow, with three brown stripes; antennae (male) with seven bipectinate segments, the branches relatively short; legs dark brown; wings with a weak brownish tinge, unpatterned; cells of outer two-thirds of wing

with abundant macrotrichia; male hypopygium with the caudal margin of tergite convexly rounded; rostral prolongation of ventral dististyle compressed, the two spines relatively short, placed near midlength of the prolongation; aedeagus broad.

Male. — Length, about 7 mm.; wing, 7.3 mm.; antenna about 2.5 mm.

Rostrum pale brown; palpi dark brown. Antennae (male) black, the apical stems of the flagellar segments whitened; basal flagellar segment with a single stout lobe; succeeding seven segments each with two branches of moderate length, the longest approximately twice as long as the segments; flagellar segment nine apparently with a single branch; outer three segments simple. Head above brownish gray, the broad orbits and genae light gray; anterior vertex narrow.

Pronotum brown. Mesonotal praescutum yellow with three brown stripes, the central one broad; posterior sclerites of notum chiefly medium brown. Dorsal pleurites, including the membrane, chiefly infuscated, deepening to a narrow stripe below; ventral half of pleura and the sternites light yellow, with a very narrow interrupted brown stripe, appearing as a spot on the fore coxa and a narrow line over the sternopleurite. Halteres dark brown, the base of stem restrictedly light yellow. Legs with the coxae yellow, the fore pair patterned as described; trochanters yellow; remainder of legs dark brown, the femoral bases restrictedly yellow. Wings (Fig. 27) with a weak brownish tinge, unpatterned, only the stigma vaguely more darkened; veins brown. Abundant macrotrichia in cells of outer two-thirds of wing, these virtually restricted to the centers of the individual cells. Venation: *Sc* moderately long, *Sc*₁ ending about opposite midlength of *Rs*, *Sc*₂ near its tip; free tip of *Sc*₂ nearly in transverse alignment with *R*₂, *R*₁₋₂ jutting a short distance beyond this point; cell *1st M*₂ small, shorter than vein *M*₄; *m-cu* close to fork of *M*. A distinct fold in about the outer half of cell *Cu*, lying a little closer to vein *1st A* than to *Cu*, not quite reaching the posterior border.

Abdomen, including hypopygium, dark brown. Male hypopygium (Fig. 36) with the tergite, *9t*, small, the caudal margin convexly rounded, with groups of marginal setae. Basistyle, *b*, relatively small, subequal in area to the ventral dististyle; ventromesal lobe simple. Dorsal dististyle a gently curved darkened rod, the tip acute. Ventral dististyle, *vd*, sub-circular in outline; rostral prolongation compressed, the two spines relatively short, slightly unequal, placed at near midlength

of the prolongation. Gonapophysis with mesal-apical lobe blackened, weakly bilobed at apex. Aedeagus, α , pale, broad, at apex with two divergent blades.

Habitat: Peru.

Holotype, σ , Utcuyacu, Tarma, Junin, altitude 1600-3000 meters, March 9, 1948 (Woytkowski).

This very distinct fly needs no comparison with any other member of the subgenus so far described. The single character of hairy wings is sufficient to separate it from all such relatives throughout the World.

Limonia (Rhipidia) multiramosa, sp. n.

Size large (wing, male, 10 mm.); praescutum chiefly obscure yellow, the margins darker; posterior sclerites of notum chiefly darkened; pleura pale, with a very conspicuous black longitudinal stripe; antennae (male) with eleven long-bipectinate flagellar segments, the first segment being thus branched; femora yellow, the tips narrowly darkened; wings pale brown, patterned with yellow areas; male hypopygium with the tergite transverse, the setae very reduced; dorsal dististyle long, more or less constricted before tip; rostral prolongation of ventral dististyle with two very short spines and two unusually long and powerful bristles lying more basad.

Male. — Length, about 9 mm.; wing, 10 mm.; antenna, about 4.7 mm.

Rostrum black, nearly as long as the remainder of head; palpi black. Antennae (male) large, with eleven long-bipectinate flagellar segments (Fig. 24), these including flagellar segments one to eleven, inclusive, only the terminal segment being unbranched; longest branches (about flagellar segment six or seven) approximately three times the segment; first flagellar segment with the branches only slightly unequal, about one-fourth longer than the segment; eleventh segment with the branches about one-half longer than the segment; antennae black, the long apical necks of the flagellar segments abruptly light yellow; terminal segment yellowish brown. Head gray, broadly holoptic.

Pronotum brownish yellow. Mesonotal praescutum chiefly obscure brownish yellow, the margins darker; scutal lobes brown, the median area and base of scutellum yellow, the remainder of the latter brownish gray; mediotergite brownish gray in central portion, the sides, with the dorsal pleurotergite, pale yellow. Pleura pale brown or yellowish brown, with a very conspicuous black

longitudinal stripe extending from the sides of the pronotum across the dorsal pleurites to the base of abdomen, passing beneath the root of the halteres; ventral sternopleurite a trifle infuscated. Halteres infuscated, the base of stem and apex of knob narrowly whitened. Legs with the coxae yellow, weakly darkened basally; trochanters yellow; femora yellow, with a narrow darkened terminal ring on the fore legs, on the posterior femora this being slightly subterminal in position; tibiae and tarsi pale brown. Wings with the ground chiefly pale brown, on the cephalic half basad of cord broken by pale yellow interspaces that are much smaller than the dark clouds; beyond the cord the ground is chiefly yellow, with darkened centers in cells R_2 , R_3 and M_4 ; spots at the costal border deepening into brown, the third at the origin of R_s , the fifth at stigma; cord and outer end of cell 1st M_2 narrowly seamed with brown; veins brown, yellow in the costal interspaces and most of vein Cu . Venation: Sc_1 ending about opposite three-fifths the length of R_s , Sc_2 near its tip; cell 1st M_2 subequal to or shorter than vein M_4 ; $m-cu$ about one-third its length before the fork of M .

Abdominal tergites pale yellowish brown, the caudal borders of the segments narrowly pale brown, the lateral borders narrowly blackened; sternites more yellowed; hypopygium brownish yellow. Male hypopygium (Fig. 39) with the tergite, $9t$, transverse, the caudal margin truncate, without lobes; setae very reduced, with only four major ones at either end of the tergal plate; proctiger not developed. Basistyle, b , with ventromesal lobe large, narrowed outwardly, terminating in a strong seta, the lower face of the lobe with numerous long setae from strong basal tubercles; on mesal face of style near base with two powerful bristles. Dorsal dististyle long, more or less constricted at near three-fourths the length, the outer portion slightly expanded, terminating in an acute spine. Ventral dististyle, vd , smaller than the basistyle in area, the rostral prolongation moderately long, narrowed outwardly, terminating in a strong bristle; rostral spines two, very small, placed at near midlength of prolongation; still more basad on prolongation with two powerful bristles of unusual length, being approximately as long as the entire prolongation. Gonapophysis, g , with mesal-apical lobe nearly straight, the acute tip bent laterad.

Habitat: Southeastern Brazil.

Holotype, ♂, Armadillo, near Angra dos Reis, Rio de Janeiro, altitude 10 meters, July 29, 1945 (Lauro Travassos Filho).

Among the relatively few regional species having similarly branched antennae, including two long branches on the first flagellar segment, the present fly is closest to *Limonia (Rhipidia) bruchiana* Alexander, which differs in all details of coloration and in the structure of the male hypopygium, particularly of the tergite, dorsal dististyle and the rostral prolongation of the ventral dististyle. In *bruchiana*, the powerful bristles near the base of the prolongation are lacking.

Limonia (Rhipidia) persimplex, sp. n.

Praescutum yellow in front, becoming castaneous behind, the posterior third brownish black; pleura and pleurotergite yellow, with a very conspicuous black dorsal stripe; antennae unusually simple in structure; halteres yellow; femora yellow, the tips of the fore pair blackened; wings very pale yellow, with a restricted brown and gray spotted and dotted pattern; male hypopygium with the rostral prolongation of the ventral dististyle slender, with two widely separated spines.

Male. — Length, about 6 mm.; wing, 6.5 mm.; antenna, about 1 mm.

Rostrum unusually long for a member of this subgenus, subequal to the remainder of head, black throughout; palpi black. Antennae (Fig. 21) unusually short, the flagellar segments virtually simple; scape and pedicel black, flagellum pale brownish yellow, the more proximal segments a trifle darker; flagellar segments subpectinate, a little produced on one face only; longest verticils unilaterally distributed. Head brown; anterior vertex reduced to a narrow line that is only about as wide as one or two rows of ommatidia.

Pronotum and pretergites clear light yellow, blackened ventrally and on the pleural region. Mesonotal praescutum orange medially in front, becoming more castaneous behind to beyond midlength of the sclerite, the sides similarly yellowed but sparsely pruinose; posterior third of praescutum brownish black; scutal lobes brownish black, the median region and the scutellum testaceous yellow, the latter darker posteriorly, the parascutella pale; postnotum yellow, the mediotergite with a brown central triangle, its point directed caudad. Pleura and pleurotergite yellow, with a broad conspicuous black longitudinal stripe occupying the dorsal portion, from the propleura to the root of the halteres. Halteres uniformly pale yellow. Legs with coxae and trochanters yellow; femora yellow, the tips of the fore pair conspicuously black, the middle and posterior pairs uniformly yellow; tibiae and tarsi yellow, the terminal tarsal segments

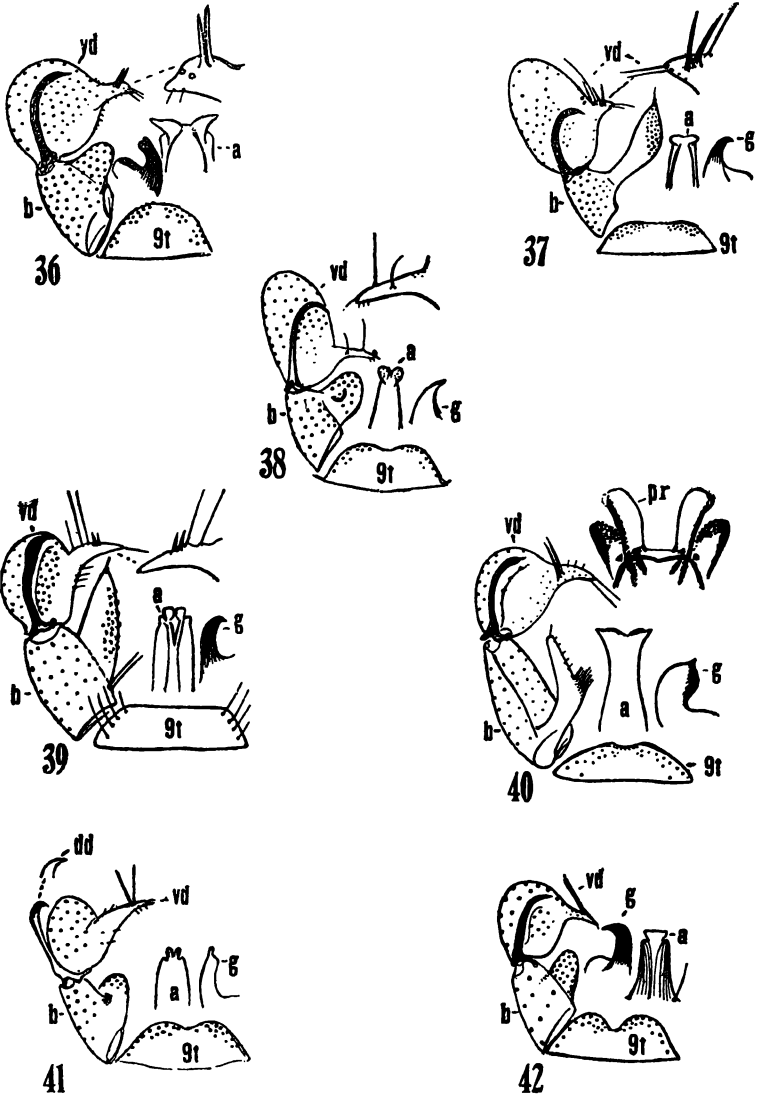


Fig. 36. *Limonia (Rhipidia) mordax*, sp. n.; male hypopygium. — Fig. 37. *Limonia (Rhipidia) phaon*, sp. n.; male hypopygium. — Fig. 38. *Limonia (Rhipidia) persimplex*, sp. n.; male hypopygium. — Fig. 39. *Limonia (Rhipidia) multiramosa*, sp. n.; male hypopygium. — Fig. 40. *Limonia (Rhipidia) proctigerica*, sp. n.; male hypopygium. — Fig. 41. *Limonia (Rhipidia) pratti*, sp. n.; male hypopygium. — Fig. 42. *Limonia (Rhipidia) tresias*, sp. n.; male hypopygium. — (Symbols: a, aedeagus; b, basistyle; dd, dorsal dististyle; g, gonapophysis; pr, proctiger; t, tergite; vd, ventral dististyle).

brownish black; claws (male) relatively short, twisted, with a stout spikelike subbasal spine and a smaller conical tooth lying still more basad. Wings (Fig. 28) very pale yellow, with a restricted brown spotted and gray dotted pattern; the brown spots occur above the arculus, a larger area at near mid-distance between arculus and origin of *Rs*, extending from *C* to *M*; very restricted clouds at origin of *Rs* and over fork of *Sc*; stigma oval, dark brown; the paler gray areas occur as seams over cord and outer end of cell *1st M*₂; at ends of the longitudinal veins, largest at *R*₃, *Cu*₁, *1st A* and *2nd A*, and as scattered dots in the cells basad of the cord; veins yellow, darker in the patterned areas. Venation: *Sc*₁ ending nearly opposite midlength of *Rs*, *Sc*₂ near its tip; *R*₂ fully three times the free tip of *Sc*₂; *m-cu* just before the fork of *M*.

Abdomen yellow, the tergites restrictedly patterned with darker on the posterior lateral angles, the amount increasing on the outer segments; subterminal segments more uniformly darkened; hypopygium yellow. Male hypopygium (Fig. 38) with the tergite, *9t*, transverse, the caudal margin very gently emarginate, the lobes low. Basistyle, *b*, with the ventromesal lobe stout, on its face with a small accessory lobule. Dorsal dististyle slender, gradually narrowed into a long acute blackened point. Ventral dististyle, *vd*, relatively large, its area exceeding twice that of the basistyle; rostral prolongation long and slender, with two widely separated spines, the outer from a small basal tubercle, long and nearly straight, the more basal one with its tubercle greatly reduced, shorter and slightly curved. Gonapophysis, *g*, with mesal-apical lobe stout, blackened, narrowed to an acute point.

Habitat: Peru.

Holotype, ♂, Carpish, Huanuco, altitude 2800 meters, in dwarf fog forest, October 8, 1946 (Woytkowski).

While generally similar to species such as *Limonia (Rhipidia) annulicornis* (Enderlein), *L. (R.) subpectinata* (Williston), and others, the present fly is entirely distinct in all details of coloration of the body and wings, and in the structure of the male hypopygium.

Limonia (Rhipidia) phaon, sp. n.

Allied to *flabelliformis*; antennae (male) with ten long-biflabellate flagellar segments; praescutum with three cinnamon-brown stripes; pleura with a conspicuous brownish black dorsal stripe; halteres with stem black, apex of knob light yellow; femora

light brown, with a vague light yellow subterminal ring; wings whitish cream-color, with a very heavy dark and paler brown pattern that much restricts the ground; a weak spur of vein R_{1-2} just beyond the level of R_2 ; male hypopygium with the tergite feebly sclerotized; ventromesal lobe of basistyle large, clavate, with an apical tubercle that is tipped with a single fasciculate seta; rostral prolongation of the ventral dististyle short and stout, the two strong spines placed close together.

Male. — Length, about 9.5 mm.; wing, 9.5 mm.; antenna, about 3.5 mm.

Rostrum brownish black, about one-third the remainder of head; mouthparts conspicuous; palpi black. Antennae (male) elongate, with ten long-biflabellate flagellar segments, involving segments four to thirteen, inclusive; longest branches (about flagellar segments six to eight) exceeding three times the segments; branches of segments four and five slightly unequal; terminal segment long, about equal to or slightly exceeding in length the branches of the penultimate segment; antennae black, the elongate apical necks of the flagellar segments whitened. Eyes very large, the head virtually holoptic, the long space of the vertex between the eyes scarcely one-half as wide as a single row of ommatidia; remainder of head reduced, dark gray.

Pronotum light brown, darker laterally. Mesonotal praescutum with three light cinnamon stripes, the restricted humeral region and posterior interspaces more yellowed, lateral praescutal border weakly infuscated; scutal lobes light brown, the median region and central part of scutellum more yellowed; postnotum on suture between the mediotergite and pleurotergite broadly yellowed, the anterior end of the latter brownish black. Pleura with a broad conspicuous brownish black longitudinal stripe occupying the dorsal pleurites from the cervical region to the pleurotergite, as described, including also the dorsopleural membrane; sternopleurite more chestnut, metapleura and meron darker brown. Halteres with stem brownish black, narrowly whitened at base, the knob conspicuously light yellow. Legs with the coxae medium brown; trochanters yellow; femora light brown, with a vague more yellowed ring immediately before the exceedingly narrow darkened tip; remainder of legs obscure yellowish brown, the outer tarsal segments darker brown; claws (male) relatively small, with two strong spines, the outermost larger. Wings (Fig. 29) with the restricted ground whitish cream color, more extensively patterned with dark and paler brown, the darkest

pattern including five costal areas, the third at origin of R_s , the fifth stigmal, the pale interspaces much reduced; remainder of wing surface virtually covered by paler brown washes, restricting the ground, in the basal radial cells the washes being backward extensions of the costal interspaces; the more important pale marks include the outer ends of cells M and $1st A$, bases of Anal cells, and less evident brightenings beyond the cord, including the narrow wing tip; veins brown, a trifle brighter in the interspaces. Venation: Sc_1 ending nearly opposite three-fourths the length of R_s , Sc_2 near its tip; a weak spur of R_{1-2} just beyond the level of R_2 ; $m-cu$ at or just beyond the fork of M .

Abdomen bicolored, the bases of the segments broadly yellow, about the outer half or less brownish black; outer segments, including the hypopygium, more uniformly brownish black. Male hypopygium (Fig. 17) with the tergite, $9t$, transverse, narrow, the caudal margin nearly truncate but only weakly sclerotized, particularly the nearly membranous central portion, the lateral parts with numerous setae, those toward the midline smallest. Basistyle, b , small, the ventromesal lobe large and clavate, at apex produced into a cylindrical tubercle that is tipped with a single very powerful bristle; distribution of setae of lobe indicated on figure by punctures, those nearest base longer and more powerful. Dorsal dististyle a curved hook, the tip acute. Ventral dististyle, vd , relatively large and fleshy, its area approximately twice that of the basistyle; rostral prolongation short and stout, with two strong spines that are placed close together on the face of the prolongation at near midlength; immediately proximad of these spines is a seta of unusual length, with two other shorter curved bristles on face of style above base of prolongation. Gonapophysis, g , with mesal-apical lobe blackened, the subacute tip stout. On sides of aedeagus at base with four powerful bristles on either side, these possibly borne on the proctiger rather than on the aedeagus itself.

Habitat: Peru.

Holotype, ♂, Sariapampa, Huanuco, altitude 3600 meters, in fog forest, May 13, 1946 (Woytkowski).

The nearest ally of the present fly is *Limonia (Rhipidia) flabelliformis* Alexander, which differs especially in the details of structure of the male hypopygium, and in the coloration of the body, legs, halteres and wings.

Limonia (Rhipidia) pratti, sp. n.

Allied to *shannoni*; size small (wing, male, 5 mm.); general coloration of mesonotum brownish yellow, the praescutal stripes indicated behind; postnotal mediotergite chiefly blackened; antennal flagellum brownish yellow, the more basal segments weakly produced; femora yellow, with a narrow, pale brown subterminal ring; wings with a restricted costal pattern of dark brown and with abundant paler grayish brown dots in all the cells; male hypopygium with the rostral spines long and slender, about twice as long as the apex of the prolongation beyond them.

Male. — Length, about 4.5 mm.; wing, 5 mm.; antenna, about 0.9 mm.

Rostrum and palpi brownish black. Antennae of moderate length; scape and pedicel brownish black, flagellum brownish yellow, the outer segments a trifle darker; basal flagellar segments (male) weakly produced to subpectinate, beyond the fifth or sixth becoming long-cylindrical; basal segments with a short glabrous apical neck. Head grayish brown; eyes large, with relatively coarse ommatidia; anterior vertex reduced to a narrow strip.

Pronotum brownish black above, paler on sides. Mesonotal praescutum with the restricted ground brownish yellow, the surface virtually covered by three black stripes on posterior third and a general brownish black coloring over the remainder of sclerite excepting the sides; scutal lobes brownish black, the narrow central portion and sides of the lobes obscure yellow; scutellum chiefly brownish yellow, restrictedly patterned with darker; postnotal mediotergite chiefly blackened, yellow on sides and along posterior border; pleurotergite uniformly pale yellow. Pleura brownish yellow, with two narrow dark brown stripes, the more dorsal one slightly narrower; ventral stripe beginning on the fore coxa, crossing the central portion of the sternopleurite, involving the bases of the remaining coxae and the meral region. Halteres pale, knobs weakly darkened. Legs with the coxae yellow, patterned with dark brown, as described; trochanters yellow; femora (a single fore leg remains) yellow, with a narrow, pale brown subterminal ring; outer tarsal segments blackened. Wings with a pale cream-colored ground, variegated by about six small dark brown spots in costal region, and abundant grayish brown dots in all the cells; the darker spots lie above arculus, beyond midlength of vein *Sc*, origin of *Rs*, fork of *Sc*, stigma, and tip of vein *R*₃; cord and outer end of cell *1st M*₂ less evidently

seamed with brown; the gray dots and clouds in cells more or less confluent, especially behind the radial field; veins yellow, dark brown in the patterned fields. Venation: Sc moderately long, Sc_1 ending just before midlength of Rs , Sc_2 near its tip; a supernumerary crossvein in cell Sc at the second darkened costal area; cell $1st M_2$ a little longer than vein M_3 beyond it; $m-cu$ about three-fifths the distal section of Cu_1 and about one-fourth its own length before the fork of M ; cell $2nd A$ wide.

Abdomen brown, somewhat darker laterally, hypopygium paling to yellow. Male hypopygium (Fig. 41) with the tergite, $9t$, transverse, the caudal margin very shallowly emarginate, the lateral lobes correspondingly broad and very obtuse. Basistyle, b , with the lobe simple, its apex and outer surface with conspicuous setae, including a concentration of smaller ones near base on a small tubercle. Dorsal dististyle with surface at midlength with microscopic appressed points. Ventral dististyle, vd , very small, its rostral prolongation correspondingly large; rostral spines two, long and slender, about twice as long as the apex of the prolongation beyond the base of the outermost spine; spines arising close together, basal tubercles lacking. Gonapophysis, g , with mesal-apical lobe darkened, especially at tip, terminating in a small spinous point.

Habitat: Puerto Rico.

Holotype, ♂, Luquillo, November 6, 1943 (H. D. Pratt).

I take great pleasure in naming this species for Dr. Harry D. Pratt, my former student, to whom I am greatly indebted for many Tipulidae from Puerto Rico and various parts of the eastern United States. The most similar described species is *Limonia (Rhipidia) shannoni* (Alexander), which differs especially in the larger size, details of coloration, and especially in the structure of the male hypopygium, particularly the short rostral spines, which are slightly unequal in size and are only about as long as that part of the prolongation beyond their point of insertion. I had considered a female specimen from the Canal Zone as being conspecific with the types of *shannoni* (Maryland, U.S.A.) but in the light of the discovery of the present fly this determination must be questioned. There may prove to be in Tropical America other still undescribed species that are allied to *shannoni*.

Limonia (Rhipidia) proctigerica, sp. n.

Size small (wing, male, 5.2 mm.); general coloration of mesonotum reddish brown, unpatterned; pleura black dorsally, yellow below; antennae (male) with eight bipectinate flagellar segments; wings with a strong blackish tinge, unpatterned; male hypopygium with the proctiger conspicuously developed,

sclerotized; ventromesal lobe of basistyle strongly angulated, the outer margin at the angle with a brush of long setae; rostral prolongation of ventral dististyle long, the two spines placed on side of prolongation near base; mesal-apical lobe of gonapophysis bulbous and apiculate at apex.

Male. — Length, about 5 mm.; wing, 5.2 mm.; antenna, about 2 mm.

Rostrum black, slightly elongate; palpi black. Antennae black throughout, in male with eight bipectinate flagellar segments, on flagellar segments two to nine, inclusive; longest branch nearly twice as long as the segment; first flagellar segment merely produced; second segment with the branches unequal in length, one being approximately twice as long as the other; branches of succeeding segments less evidently unequal in length; tenth flagellar segment with a single branch subequal in length to the segment; eleventh segment merely produced; terminal segment elongate, simple, pointed at tip. Head dark gray; anterior vertex very reduced.

Pronotum black. Mesonotum chiefly reddish brown, without a distinct pattern. Pleura with a broad black dorsal longitudinal stripe extending from the propleura to the base of abdomen, passing beneath the root of halteres; ventral pleurites and sternum abruptly yellow. Halteres infuscated, the base of stem narrowly obscure yellow. Legs with all coxae and trochanters yellow; femora brownish black, the bases only vaguely brightened, tibiae and tarsi somewhat paler brown. Wings with a strong blackish tinge, variegated only by the vaguely more darkened stigma; veins and macrotrichia dark brown. Venation: *Sc* long, *Sc*₁ ending just beyond midlength of *Rs*, *Sc*₂ near its tip; free tip of *Sc*₂ and *R*₂ both pale, in transverse alignment, without a spur of vein *R*₁₋₂; cell 1st *M*₂ subequal in length to vein *M*₄; *m-cu* shortly before the fork of *M*.

Abdomen, including hypopygium, brownish black, the incisures even darker. Male hypopygium (Fig. 40) with the ninth tergite, *9t*, transverse, narrowed strongly behind, the margin convex, the central portion weakly emarginate. Proctiger, *pr*, very conspicuous, when compared with most of the generally similar species listed below; in shape about as figured, with various heavily blackened lines and thickened areas, the outer lobes of the structure with a mat of microscopic appressed tubercles or blunt points to produce a macelike appearance. Basistyle, *b*, with the ventromesal lobe unusually basal in position, large, the base stout; apical

half narrowed and bent more or less at a right angle and narrowed to the obtuse tip; on margin at and beyond the point of angulation with a row or brush of long setae. Dorsal dististyle a gently curved blackened rod, the tip acute. Ventral dististyle, *vd*, relatively small, its total area less than that of the basistyle; rostral prolongation flattened, elongate, terminating in two strong setae; rostral spines two, placed on side of prolongation near base, arising rather close together from small basal tubercles. Gonapophysis, *g*, with mesal-apical lobe unusually stout, bulbous, apiculate at tip. Aedeagus broad, its apex very weakly emarginate.

Habitat: Southeastern Brazil.

Holotype, ♂, Angra dos Reis, Rio de Janeiro, altitude 50 meters, July 11, 1945 (Lauro Travassos Filho).

From other small species of *Rhipidia* having blackened unpatterned wings, including *Limonia (Rhipidia) eliana*, sp. n., *L. (R.) tiresias*, sp. n., and *L. (R.) sprucei* Alexander, the present fly differs strikingly in the structure of the male hypopygium. In the developed proctiger it more resembles the otherwise quite distinct *L. (R.) tridigitata* Alexander.

Limonia (Rhipidia) tiresias, sp. n.

Size small (wing 5 mm.); thoracic notum and dorsal pleurites chiefly brownish black, the ventral pleura more reddened; antennae (male) with seven bipectinate segments, the branches relatively short; wings strongly blackish, unpatterned except for the slightly darker stigma; male hypopygium with the ventromesal lobe of basistyle simple, with a group of longer setae on mesal face; basistyle subequal in area to the ventral dististyle; rostral prolongation of the latter with two long straight spines from slightly unequal basal tubercles; aedeagus broad, the surface longitudinally ribbed.

Male. — Length, about 5.5 mm.; wing, 5 mm.; antenna, about 2.1 mm.

Rostrum and palpi black. Antennae black throughout, relatively long, being approximately two-fifths the wing; first flagellar segment with the basal enlargement oval, scarcely produced; segments two to eight, inclusive, each with two moderately long branches, the longest (flagellar segments five or six) about one-third longer than the segment, the basal enlargement relatively small, oval, merging gradually with the apical necks; flagellar segment nine with a single branch, this longer than the segment; tenth segment with a short lobe or tooth; outer two segments simple, the last elongate. Head dark colored; anterior vertex so narrow as to be virtually lacking.

Thoracic notum chiefly brownish black, the sublateral portions of the praescutum more reddened; lateral portions of postnotum similarly paler. Pleura, including the broad propleura, black, the sternal region a little more reddened or piceous. Halteres black, the base of stem restrictedly yellow. Legs with the coxae brownish black, the fore and middle pairs paling to yellow at tips; trochanters obscure yellow; femora black, the bases restrictedly yellow; tibiae and tarsi yellowed, the outer tarsal segments blackened; claws (male) long and slender, with a single long erect spine that is nearly basal in position. Wings (Fig. 30) with a strong blackish tinge, the small short-oval stigma slightly darker brown but not very conspicuous; veins and the long macrotrichia dark brown. Venation: *Sc* long, *Sc*₁ ending about opposite three-fifths *Rs*, *Sc*₂ near its tip; branches of *Rs* generally parallel to one another or slightly converging outwardly, gently narrowing cell *R*₃; cell 1st *M*₂ subequal in length to vein *M*₄; *m-cu* just beyond the fork of *M*.

Abdomen, including hypopygium, black. Male hypopygium (Fig. 42) with the tergite, *9t*, transverse, the caudal margin conspicuously notched, the lateral lobes broad, obtuse. Basistyle, *b*, with the ventromesal lobe simple, with a concentration of longer setae on the mesal face. Dorsal dististyle very gently curved and narrowed to the acute tip. Ventral dististyle, *vd*, of moderate size, subequal in area to the basistyle; rostral prolongation slender, yellow, the two spines beyond midlength, long and staright, equal to or slightly exceeding in length the prolongation itself, arising from slightly unequal basal tubercles. Gonapophysis with mesal-apical lobe black, the tip directed lateral into a spine. Aedeagus, *a*, broad, the surface conspicuously ribbed longitudinally; at base on either side with a single long seta.

Habitat: Peru.

Holotype, ♂, Chanchamayo, Junin, altitude 1100 meters, August 10, 1948 (Schunke).

The most similar species is *Limonia (Rhipidia) sprucei* Alexander, which differs evidently in the structure of the male hypopygium.

Limonia (Rhipidia) tripectinata Alexander

Limonia (Rhipidia) tripectinata Alexander; Ann. Ent. Soc. America, 24: 625-627; 1931.

The type was from Mt. Santa Marta, Colombia, collected in August 1926 by Fred W. Walker. The male hypopygium is shown (Fig. 25).